KG
11365
927

KG 11365.927

Exp

E. S. King

No 4
July 25 1902 —

KB 11365.927

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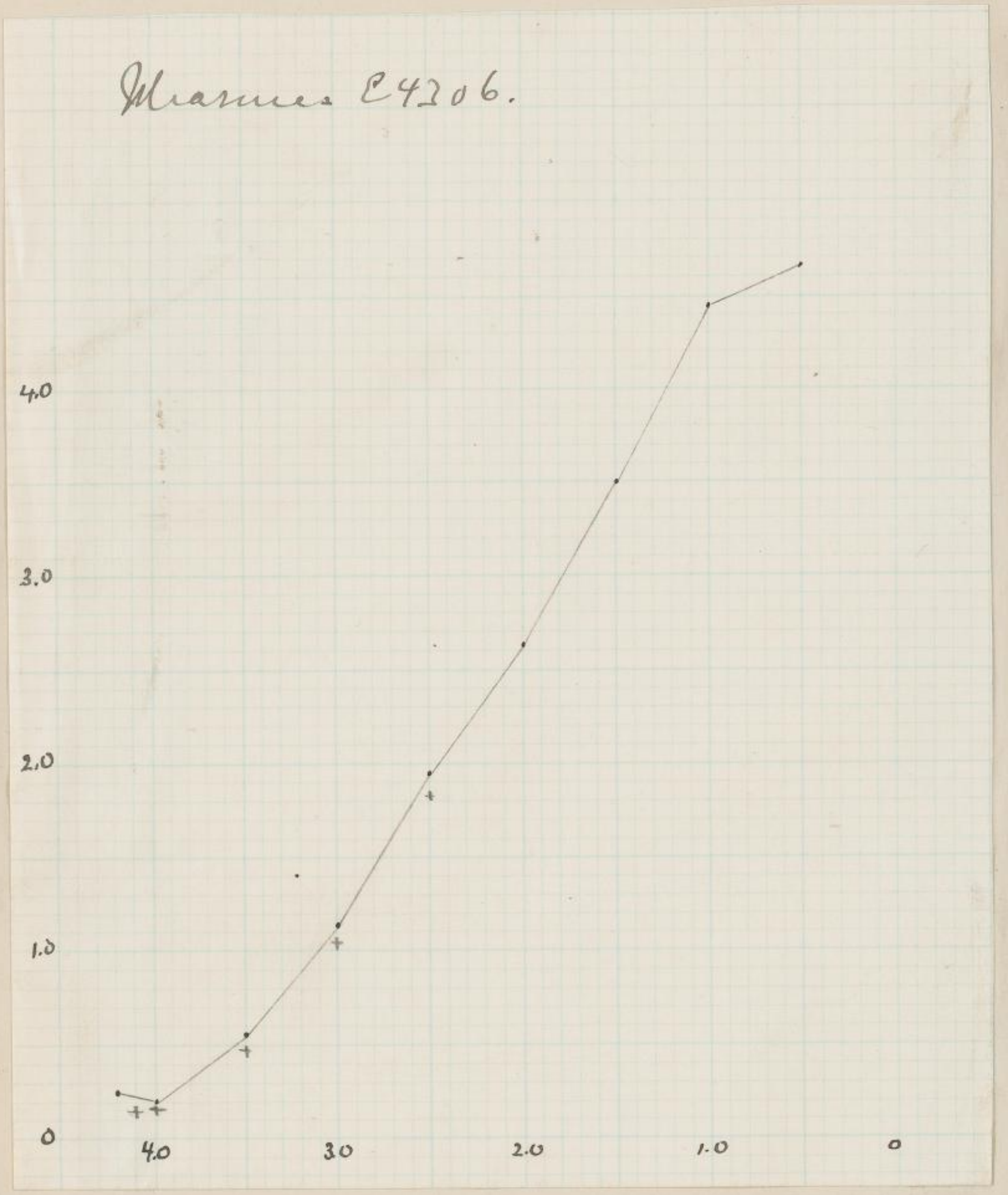


Measures of Σ 4306 continued

1.0 Left   No Shade
Index up   Index down
20.8   289.3
Rt dis. 35.1   14.3   305.8   16.5
199.2   16.1   109.4   14.4
215.3   30.4   123.8   30.9

Corrected setting; apparently at Index 1.0+

1.0 Right   No Shade   4.37
107.3   200.0   4.34
Left dis 126.5   19.2   217.0   17.0   3.98
289.3   17.1   19.4   15.5   4.22
306.4   36.3   34.9   32.5   4/ .91
516   4.45

0.5 Right   No Shade
109.2   20.8
125.5   16.3   35.0   14.2
289.5   15.1   200.4   13.6
304.6   31.4   214.0   27.8

4.30
0.5 Left.   No Shade   4.57
200.9   290.6   4.86
212.5   11.6   302.6   12.0   4.88
20.5   12.8   110.6   12.1   4/ 261
33.3   24.4   122.7   24.1   4.65

532

Saturday July 26 1902

Measures of Σ 4306 continued
Apparatus is the same as used yesterday

2 42	4.1 Left		3 Shades	
	Index up.		Index down.	
	166.2		78.3	
Lt dis.	248.1	81.9	158.8	80.5
	344.0	84.8	256.1	81.1
	68.8	166.7	337.2	161.6

	4.1 Right		3 Shades		0.25
	248.2		343.7		0.35
Lt dis.	342.5	94.3	71.9	88.2	−0.04
	72.5	87.7	160.6	91.7	0.00
	160.2	182.0	252.3	179.9	4)0.56
2 55					0.14

251.3 above figures	
342.0	90.7
73.0	85.3
158.3	186.0

Saturday July 26 1902

3 06	4.0 Right		3 shades		
	Index up		Index down.		
	250.6		161.0		
Left di	339.7	89.1	246.8	85.8	
	70.4	90.6	341.7	87.7	
	161.0	179.7	69.4	173.5	
					0.01
	4.0 Left		3 Shades		0.12
	345.3		73.3		0.34
Rt dis	67.1	81.8	159.3	86.0	0.22
	167.6	80.1	253.7	82.5	4 | 0.69
	247.7	161.9	336.2	165.5	0.17
3 20					
3 56	3.5 Left		2 Shades		
	349.7		256.8		
	67.4	77.7	334.4	77.6	
	169.4	76.7	80.0	75.0	
	246.1	154.4	155.0	152.6	0.49
					0.52
	3.5 Right		2 Shades.		0.44
	77.8		168.0		0.49
	154.4	76.6	245.4	77.4	4 | 1.94
	253.7	80.1	347.5	76.9	0.48
	333.8	156.7	64.4	154.3	
410					

Saturday July 26 1902

3.0 Right 2 Shades

Index up		Index down	
84.2		352.2	
148.3	64.1	61.5	69.3
263.2	64.6	171.7	68.3
327.8	128.7	240.0	137.6

				1.00
3.0 Left		2 Shades		0.82
178.8		264.0		1.20
238.6	59.8	326.1	62.1	1.16
355.8	59.8	86.2	59.3	4)4.18
55.6	119.6	145.5	121.4	1.04

4 40

2.5 Left 1 Shade

	183.8	185.8		93.6	
44.5	228.3	228.6	42.8	138.7	45.1
48.3	2.2	3.2	48.8	275.6	44.1
92.8	50.5	51.0	91.6	319.7	89.2

				1.87
2.5 Right		1 Shade		1.94
273.0		180.9		1.79
319.1	46.1	229.7	48.8	1.73
91.6	48.6	2.6	48.4	4)7.33
140.2	94.7	51.0	97.2	1.83

Examined adjustments. Found that dark part apparently interfered with both images. Stop was correct but standard had not been shoved home.

Saturday July 26 1902

2.5 Remeasured Right. 1 Shade

Index up		Index down	
93.6		180.0	
140.2	46.6	231.0	51.0
270.7	57.2	359.7	52.0
321.9	97.8	51.7	103.0

2.5 Left 1 Shade

5.7		276.0	
47.8	42.1	316.2	40.2
180.0	46.7	92.6	44.4
226.7	88.8	137.0	84.6

1.71
1.58
1.95
2.06
4|7.30
1.82

5 50 1

Sig 15 of a S365 ~~Left~~ Right Aperture. 1 Shade

7 48

Index up		Index down	
83.0		178.7	
147.2	64.2	233.9	55.2
265.1	61.5	358.2	57.2
326.6	125.7	55.4	112.4

1.07
1.36
1.43
1.56
4|5.42
1.36

Sig 15 of a S365 Left aperture 1 Shade

359.4		270.6	
54.9	55.5	323.2	52.6
179.6	54.1	90.3	51.5
233.7	109.6	141.8	104.1

8 04

Lamp juice Left arm

Index ~~up~~ down Index ~~down~~ up

280		187		
314	34	226	39	
94	40	9	36	
134	74	43	75	

				2.38
				2.35
12		101		2 94
40	28	133	32	2.75
194	30	281	31	4 / 2 4 2
224	58	312	63	2.60

Left

284.4		193.8		
309.0	24.6	217.7	23.9	3.28
103.1	25.3	14.3	24.0	3.37
128.4	49.9	38.3	47.9	

Right

9.0		100.5		2.60
44.3	35.3	129.0	28.5	
191.1	31.9	278.7	32.6	2.82
223.0	67.2	311.3	61.1	4 / 12.07
				3.02

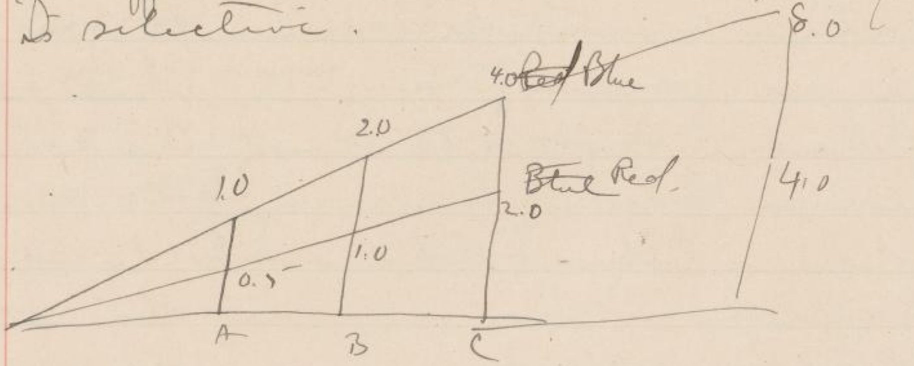
Monday July 28 1902

From examination of AI 206, 8 & 10 it appears ~~that~~ the spots on these plates are similar & probably due in some way to the slides or holder. After taking AI 210 the slides were removed to another holder. This holder was loaded & placed in the pigeon hole for holders ready for use. My previous opinion is strengthened ~~that~~ the spots are due to some influence like ~~that~~ of radium.

Saturday Sept 6 1902

Continued

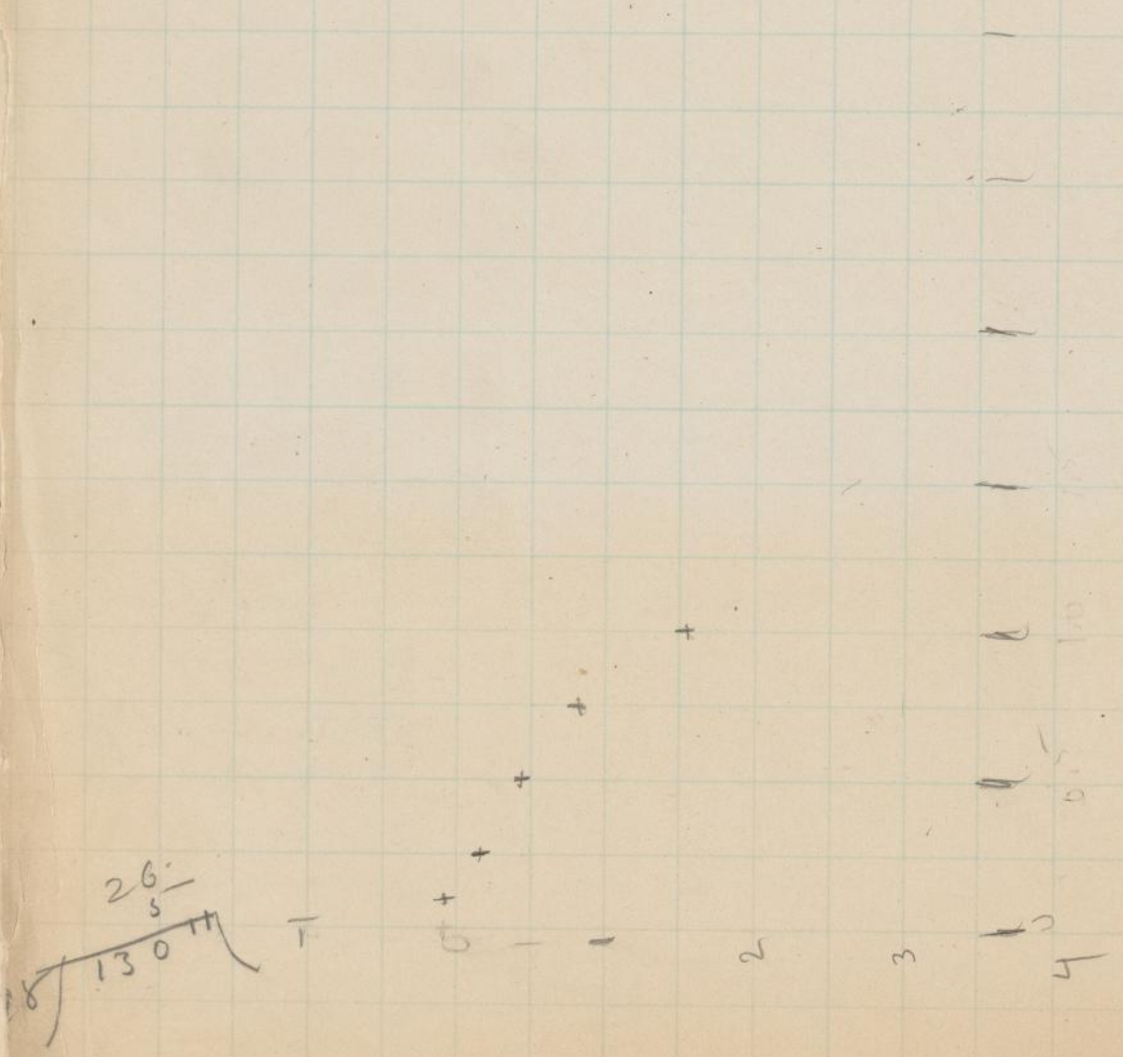
Effect ~~upon~~ absorption by ~~two~~ sources of light of different color when the absorption of the wedge is selective.

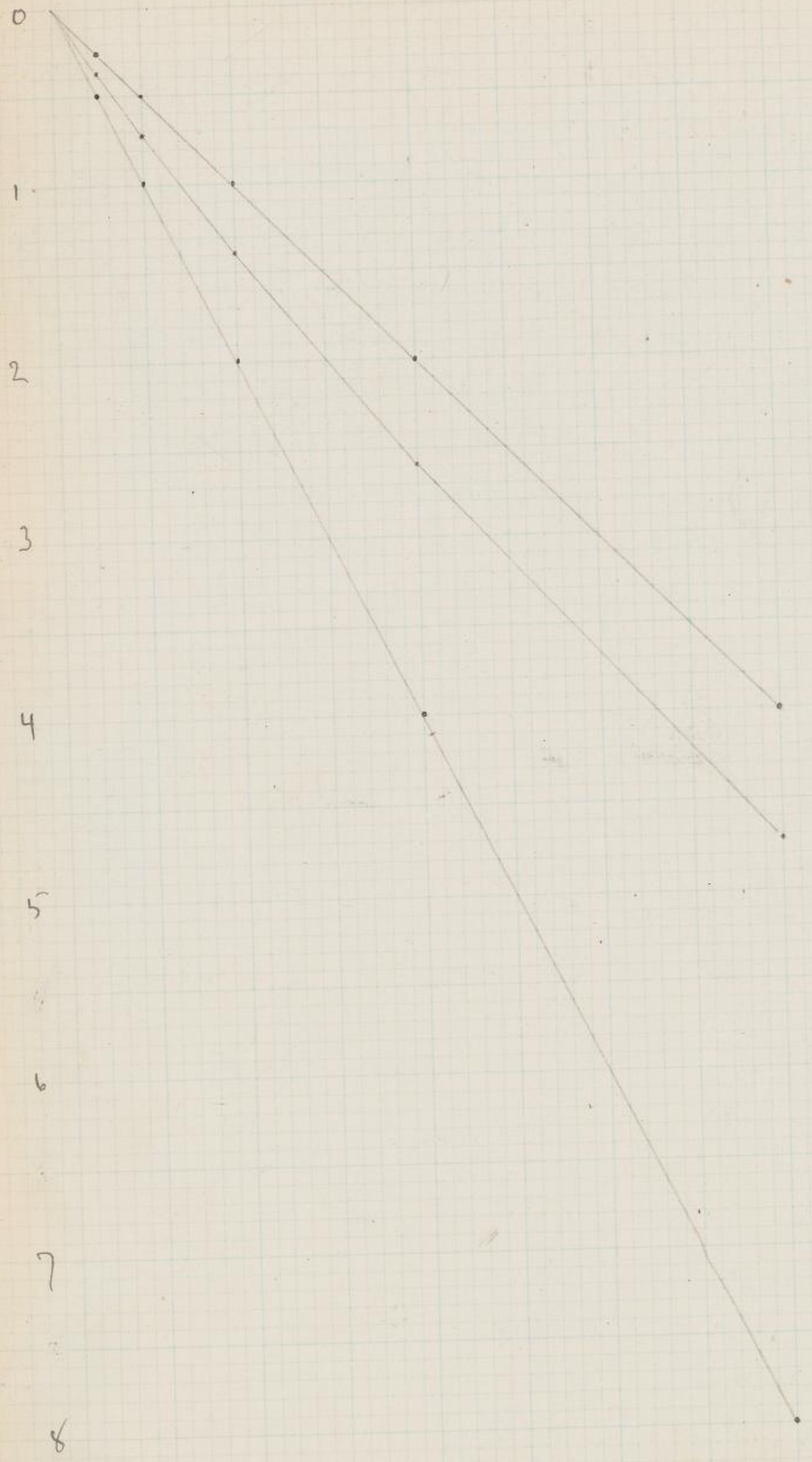


	0.25	0.5	1.0	2.0	4.0	8.0
	.4	.4				
	0.1	0.2	0.4	0.8	1.6	3.2
	9.9	9.8	9.6	9.2	8.4	6.8
	0.794					
Per cent transmitted		0.631	0.398	158 0.~~200~~	0.0.25	0.0006

Assume Red & Blue of equal intensities - the Combined ~~absorption~~ transmission is

		A			
	0.794	0.631	0.398	158 0.~~200~~	0.0006
	0.631	0.398	158 0.~~200~~	0.025	0.025
	2/1.425	2/1.029	2/ 556 0.~~598~~	2/ 1832 0.~~223~~	2/ 0.0256
	0.712				
transmitted.		0.514	~~0.299~~	~~0.112~~	0.0128
			0.278	0.092	
	9.852	9.711	9.444	8.964	8.107
	4/0.148	0.4 / 0.289	0.556	1.036	1.893
	0.37	0.72	1.3~~4~~ 9	2.59	4.73
			7.		


26.5
8
130
1̄
0
2
3
4



262

conclusion.

of absorption from

ts (the two light

h the scale of

will be a

the combination.

d by a curve

a straight

of absorption at

Saturday Sept 6 1902

Assum

From preceding work. the conclusion is ~~that~~ with different powers of absorption for rays of Red and of Blue light (the two light assumed of equal intensity) although the scale of the wedge for either light alone will be a straight ~~[illegible]~~ line, yet for the combination the absorption is represented by a curve which ~~shows to~~ deviates from a straight line so as to show a loss of absorption at the thick end of the wedge.

Tuesday Sept 9 1902

Arranged apparatus for measuring wedge of Horizontal Telescope.

Welsbach shines through two pinholes of nearly 1mm in aperture and 19 mm apart. The pinholes are made in black paper resting against a piece of ground glass. The wedge is placed in a vertical position at about 8 c.m. distance. The part measured is 2.17 in nearer the lighter portion than the graduation on the brass frame. i.e. Measure of reading 3.0 is that of part opposite graduation 0.83.

See below

Old Cooke Lens (Front surface plane!) is placed about 147 cm from pinholes. Lens used at f/11.

Images are viewed without eyepiece through double image prism (Quartz) & used of S. ~~Amrican~~ american Bolometer.

A photographic wedge was used to cut off the light of all images equally so that the intensity of the light reaching the eyes should not be too strong for accurate ~~estimation~~ measures. ~~This was to~~

On Sept 13th 1902 suspecting an error, the values for position of wedge were remeasured & found to be 1.90 instead of 2.17 & thus setting corresponding to 3.0 would be 1.10

Tuesday Sept 9 1902

Photographic wedge used as described p 10 for settings 0.0 to 3.0 inclusive.

	Index up.		Index down.		
8 05	0.0 Right.				
Left	~~199.2~~		246.1		
~~Rt dir~~	334.9		288.0	41.9	
	18.0	43.1	66.0		2.01 ✓
	155.8	43.4	108.0	42.0	2.08 ✓
	199.2	86.5 ✓		83.9 ✓	0.~~43~~39
					0.38 ✓
	0.0 Left				4) 4.~~90~~86
Rt dir.	48.1		137.4		1.22 ✓
	126.6	78.5	216.1	78.7	
	225.2	~~79.2~~ 81	317.4	~~81.7~~6	
	306.4	15~~7~~9.7 ✓	39.0	81.6	
				160.3 ✓	
	0.5 Left				
	233.7		322.2		
	298.0	64.3	27.7	~~5~~655.5	1.02 ✓
	53.6	63.8	142.9	65.4	0.96 ✓
	119.4	128.1 ✓	208.3	130.9 ✓	2.86 ✓
					2.78 ✓
3.0 1.9 1.1	0.5 Right.				4) 7.62
	160.7		70.4		1.90 ✓
	190.4	29.7	101.4	31.0	
	340.6	30.2	252.6	31.1	
	10.8	59.9 ✓	283.7	62.1 ✓	

Index up — Index down

1.0 Right — Correction 0.99

344.1		76.1		
7.9	23.8	97.0	20.9	
164.5	24.1	258.0	18.2	3.37 ✓
188.6	47.9 ✓	276.2	39.1 ✓	3.82 ✓
				1.~~82~~ 79 ✓

1.0 Left — Correction 0.99

				1.74 ✓
243.1		153.5		4) 10.78
289.0	45.9	201.5	48.0	2.6~~9~~ 8 ✓
63.0	4~~7~~4.7	331.8	48.7	
111.7	9~~3~~4.6 ✓	20.5	96.7 ✓	

1.5 Left — Corrected 1.48

67.6		58.2 ~~196.0~~		
104.4	46.8	196.0	37.8	
249.6	35.8	337.0	37.5	
285.4	72.6 ✓	141.5	75.3 ✓	2.42 ✓
				2.34 ✓

1.5 Right — Correction 1.48

				4.23 ✓
349.3		258.7		4.42 ✓
5.3	16.0	274.2	15.5	4) 13.41
168.3	16.4	80.0	14.3	3.35 ✓
184.7	32.4 ✓	94.3	29.8 ✓	

Index up   Index down

2.0 Right

170.2		261.3	
181.6	11.4	272.4	11.1
350.9	11.4	81.1	11.2
02.3	22.8 ✓	92.3	22.3 ✓

2.0 Left

74.4		343.6	
100.4	26.0	9.4	258
257.9	29.6	164.2	26.0
281.5	55.6 ✓	190.2	51.8 ✓

5.00 ✓
5.05 ✓
3.03 ✓
3.19 ✓
4) 16.27
4.07 ✓

2.5 Left

256.3		345.0	
276.2	19.9	6.8	21.8
76.5	20.9	167.6	19.9
97.4	40.8 ✓	187.5	41.7 ✓

3.72 ✓
3.68 ✓
5.63 ✓
5.50 ✓
4) 18.53
4.63 ✓

2.5 Right

~~181~~ 172.0		81.5	
181.0	9.0	91.7	10.2
352.8	8.1	263.0	8.0
0.9	17.1 ✓	271.0	18.2 ✓

Index up. Index down.

3.0 Right

353.2		83.2	
0.5	7.3	89.6	6.4
173.0	7.1	263.6	5.9
180.1	14.4 ✓	269.5	12.3 ✓

3.0 Left

260.4		170.4	
274.2	13.8	185.2	14.8
78.8	14.7	348.0	15.8
93.5	28.5 ✓	3.8	30.6 ✓

6.01 ✓
6.35 ✓
4.52 ✓
4.36 ✓
4 | 21.24
5.31 ✓

3.5 Left Shade omitted

262.0		172.3	
271.7	9.7	182.1	9.8
81.3	10.9	351.2	10.6
92.2	20.6 ✓	1.8	20.4 ✓

3.5 Right

173.9		83.6	
178.9	5.0	89.1	5.5
354.2	~~3~~4.9	264.2	4.8
359.1	~~10~~9.9 ✓	269.0	10.3 ✓

5.23 ✓
5.25 ✓
6.~~61~~82 ✓
6.74 ✓
4 | 2~~3~~4.~~8~~0~~3~~4
5.96
6.01 ✓

10 05

	Index up		Index down		
	4.0 Right.				
	174.7		265.1		
	178.0	3.3	268.4	3.3	
	355.0	3.6	84.8	3.4	
	358.6	6.9 ✓	88.2	6.7 ✓	7.61 ✓
					7.67 ✓
	4.0 Left				5.85 ✓
	82.5		352.8		5.85 ✓
	90.6	8.1	0.3	7.5	4 | 2698
	263.0	7.4	173.0	8.0	6.74 ✓
1016	270.4	15.5 ✓	181.0	15.5 ✓	

Welsbach shifted to light right [illegible]

	4.5 Right				
	355.1		84.8		
	358.7	3.6	88.2	3.4	7.54 ✓
	174.7	3.5	265.2	3.2	7.20 ✓
	178.2	7.1 ✓	268.4	6.6 ✓	~~6.78~~ 7.00 ✓
					6.98 ✓
					4 | ~~2900~~ 2922
	4.5 Left.	Previous setting was found to be about 4.49 Set now at 4.51			7.~~25~~30 ✓
	264.6		174.6		
	269.0	~~5~~4.4	179.3	4.7	
	84.3	4.7	354.2	4.5	
	89.0	~~10.1~~ 9.1 ✓	358.7	9.2 ✓	
1030					

Index up		Index down		
5.0	Left			
265.0		354.8		
267.2	2.2	358.1	3.3	
84.9	3.4	175.1	3.5	
88.3	5.6 ✓	178.6	6.8 ✓	8.06 ✓
				7.64 ✓
				8.26 ✓
5.0	Right			8.49 ✓
175.1		85.4		4/32.45
177.8	2.7	87.6	2.2	8.11 ✓
355.5	2.4	265.4	2.4	
357.9	5.1 ✓	267.8	4.6 ✓	

Difficult to measure

10 41

Measures continued same as last by H.R.C.

		Index above.		Index below	
14 00	0.0 left				69.1 66.9 136.0 ✓
		119.1		28.4	
		235.9	64.9 ✓	142.9	114.5 ✓
		298.6	62.7 ✓	212.0	109.5 ✓
		354.2	$1\overset{2}{3}7.6$ ✓	321.5	224.0 ✓ 360.0 136.0

1.03
~~0.82~~
0.86
$1.9\overset{\cancel{2}3}{5}$
1.66
$4)5.49\overset{9}{8}$
1.37 ✓

0.0 right		$\overset{5}{\cancel{3}}7.4$ 32.1 $\cancel{6}89.5$		
	4.1		61.0	
	148.5	144.4 ✓	112.0	51.0
	205.9	$12\overset{6}{\cancel{7}}.1$ ✓	243.2	48.7
	332.0	$27\overset{0}{\cancel{1}}.5$ ✓ $3\,6\,0\,\overset{9}{}.5$ $8\cancel{8}.5$	291.9	99.7 ✓

If we assume 24.1
57.4
52.1
109.5 ✓
1.63
0.86
1.43
1.66
4) 4.98
1.24 ✓

See page 23

0.5 right

	Index above			Index below	
		39.1 39.2 78.3 ✓			
	16.0			64.2	
	158.0	142.0 ✓		106.1	41.9 ✓
	197.1	$1\overset{3}{\cancel{7}}9.7$ ✓		246.0	40.0 ✓
	336.8	360.0 $2\cancel{8}71.7$ $\overset{7}{\cancel{8}}8.3$ ✓		286.0	81.9 ✓

$\overset{2.25}{\cancel{1.96}}$ ✓
2.14 ✓
1.73 ✓
1.71 ✓
$4)7.\overset{83}{\cancel{54}}$
~~1.88~~
1.96 ✓

0.5 left					48.2 49.6 97.8 ✓
	63.6			21.5	
	110.5	46.9 ✓		150.7	129.2
	241.7	50.2 ✓		198.9	133.0
	291.9	97.1 ✓		331.9	360 262.2 97.8

1.0 left.

Index above

68.9
104.9
247.8
286.1

36.0
38.3
74.3 ✓

Index below

14.9
158.0
196.9
338.0

~~3.1~~
38.9
36.9
75.8 ✓

2.37 ✓
2.32 ✓
2.90 ✓
2.94 ✓
4 | 25.3
2.63 ✓

1.0 right

12.8
163.1
191.2
342.0

~~6.3~~ 28.1
30.8 ✓
58.9 ✓

70.0
102.0
254.0
280.0

32.0
26.0
58.0 ✓

1.5 right

Index above

8.8
165.5
188.0
346.1

22.5
22.7
45.2 ✓

Index below

76.0
97.9
256.4
276.8

21.9
20.4
42.3 ✓

3.50 ✓
3.64 ✓
3.31 ✓
3.5~~5~~ 10 ✓
4 | ~~20 0~~ 15 5
3.5~~0~~ 39 ✓

1.5 left

75.8
99.9
254.7
279.8

24.1
25.1
49.2 ✓

10.7
163.5
191.9
345.0

28.4
25.7
~~4~~ 5 4.1 ✓

2.0 left

Index above		Index below	
77.3		7.0	
96.6	19.3	167.0	19.8
256.4	19.6	186.8	2$\overset{0}{1}$.5
276.0	38.9 ✓	346.5	4$\overset{0}{\cancel{1}}$.3 ✓

3.83 ✓
3.7$\overset{5}{\cancel{0}}$
4.23 ✓
4.38 ✓
4|161 94
4.0$\overset{5}{\cancel{4}}$ ✓

2.0 right

5.4		79.0	
168.6	16.0	94.7	15.7
184.6	16.4	259.6	14.6
349.0	32.4 ✓	274.2	30.3 ✓

2.5 right

Index above		Index below	
3.2		80.8	
170.2	12.8	92.2	11.4
183.0	12.2	261.3	10.8
351.0	25.0 ✓	272.1	22.2 ✓

4.80 ✓
5.06 ✓
4.66 ✓
4.55 ✓
4|19.07
4.77 ✓

2.5 left

80.0		3.1	
93.1	13.1	170.8	13.9
259.4	13.6	184.7	14.1
273.0	26.7 ✓	349.0	28.0 ✓

3.0 left

Index above			Index below	
82.0			1.8	
91.2	9.2		171.9	10.3
262.1	9.0		182.2	9.9
271.1	18.2 ✓	5.50 ✓	351.9	20.2 ✓
3.0 right		5.27 ✓		
0.9		5.66 ✓	82.0	
172.0	8.9	5.40 ✓	91.2	9.2
180.9	8.0	18 4 | 20 3	262.1	9.8
352.9	16.9 ✓	46 ✓ 5.~~51~~	271.9	19.0 ✓

3.5 right

Index above			Index below	
0.0			83.8	
173.0	7.0		89.8	6.0
180.0	6.5		264.0	5.8
353.5	13.5 ✓		269.8	11.8 ✓
		6.15 ✓		
3.5 left		6.44 ✓		
82.5		5.99 ✓	0.3	
90.0	7.5	5.80 ✓	173.0	8.1
263.1	7.0	4 | 24.38	181.1	7.7
270.1	14.5 ✓	6.10 ✓	352.6	15.8 ✓

4.0 left				
Index above			Index below	
89.2			359.0	
83.9	5.3		174.1	5.8 ~~5.1~~
263.8	6.1		179.9	5.1
269.9	11.4 ✓		353.9	10.9 ✓
4.0 right		6.51 ✓		
174.0		6.61 ✓	84.1	
179.1	5.1	6.84 ✓	89.0	4.9
354.3	4.7	6.98 ✓	269.0	4.3
359.0	9.8 ✓	4|294	264.7	9.2 ✓
		6.74 ✓		

4.5 right				
Index above			Index below	
175.0			84.8	
178.4	3.4		88.1	3.3
355.0	3.8		265.0	3.4
358.8	7.2 ✓	7.51 ✓	268.4	6.7 ✓
4.5 left		7.67 ✓		
89.0		7.05 ✓	175.0	
84.8	4.2	7.03 ✓	179.2	4.2
264.2	4.7	4|126	354.0	4.8
268.9	8.9 ✓	7.32 ✓	358.8	9.0 ✓

5.0 left

Index above			Index below	
85,0			175.1	
89,2	4.2		179.9	4.8
265,2	2.8		355.1	3.0
268.0	7.0 ✓		358,1	7.8 ✓
		7.57 ✓		
5.0 right		7.34 ✓		
175.3		8.44 ✓	85.3	
177'7	2.4	8.35 ✓	87.5	2.2
355.7	2.3	4|3170	265,3	2.7
358.0	4.7 ✓	7.92 ✓	268.0	4.9 ✓

18 00

Comparison Readings (Sept 1911)

246	243	+3
288	291	-3
66	61	+5
108	112	-4

assm 24

335	332	+3
18	4	+14
156	148	+8
199	206	-7

24.

48	54	-6
127	119	+8
225	236	-11
306	299	+7

32
21
53

137	143	-6
216	212	+4
317	322	-5
39	28	+11

27
21
48

29
21
50

Sept 10 1902

ame apparatus

53.1
52.9
106.0

actically unchanged for
ption that 24.1 was ready
nstrumental. Other proof
slips.

apertures & Index up.

1.5 2.0 2.5

4) 9 (+4) 5 (+2) 3

3) 166 (-3) 169 (-1) 170

(+3) 188 (+3) 185 (+2) 183

332 (-5) 337 (-5) 342 (-4) 346 (-3) 349 (-2) 351

4.1 should evidently be 24.1

1902phae.proj..92bK

6.74
1.37
4/5.37
1.34

8.11
1.22
57.684

ept 10 1902

affarah

53.1
52.9
106.0

0

As instrument is practically unchanged from last night the assumption that 24.1 was read instead of 4.1 is sustained. Other proof is given below on slips.

Comparison of Reading Rt. Aperture & Index Up.

0.0		0.5		1.0		1.5		2.0		2.5
assumed (24) 4	(+8 -12)	16	(+3)	13	(+4)	9	(+4)	5	(+2)	3
148	(-10)	158	(-5)	163	(-3)	166	(-3)	169	(-1)	170
206	(+9)	197	(+6)	191	(+3)	188	(+3)	185	(+2)	183
332	(-5)	337	(-5)	342	(-4)	346	(-3)	349	(-2)	351

4.1 should evidently be 24.1

Wednesday Sept 10 1902

Repeated with same apparatus

0.0 Right aperture

Index up		again	
327.8		329.5	
23.9	56.1	22.6	53.1
152.3	50.4	150.1	52.9
202.7	106.5	202.0	106.0

As instrument is practically unchanged from last night the assumption that 24.1 was read instead of 4.1 is sustained. Other proof is given below on slips.

Saturday Sept. 13. 1902.

Wedge measures continued by Eksham: apparatus as before except that image not seen through wedge is cut down in intensity by shade glass to about the brightness of the other image as seen through about the middle of the wedge. The purpose of this is to diminish the difference in magnitude at the extremes of the wedge ~~and the~~ between the image seen through it and the comparison image.

Index ~~above~~ below   Index ~~below~~ above

0.0 ~~left~~ right

10 10 154.7   65.3
196.7 < wedge image dis   107.7 42.4 ✓
335.0 42.0 ✓ 41.1 ✓ 83.1 ✓   244 0 41.5 ✓ 83.9 ✓
16.1 2.10 ✓   285.5 2.08 ✓

0.0 ~~right~~ left

247.8   337.8
284.8 37.0 ✓ 38.3 ✓   15.7 37.9 ✓ 38.5 ✓
68.3 75.3 ✓   158.8 76.4 ✓
106.6 2.34 ✓   197.2 2.30 ✓

2.08 ✓
10 ✓
30 ✓
34 ✓
4) 8.82 ✓
2.20 ✓

Index below | Index above

0.5 left

60.8 < wedge image dis
109.3
241.0
290.9

48.5 ✓
49.9 ✓
98.4 ✓
1.70 ✓

150.2
202.0
330.4
24.0

51.8 ✓
5 43.6 ✓
109 5.4 ✓
1.53 ✓

0.5 right

152.8
202.7
326.6
24.0

49.9 ✓
57.4 ✓
107.3 ✓
1.48 ✓

1.53 ✓
70 ✓
48 ✓
.56 ✓
4)2.27 ✓
- 1.57

60.4
113.4
240.1
291.0

53.0 ✓
50.9 ✓
103.9 ✓
1.56 ✓

1.0 right
Index below

143.0
210.6
325.4
33.2

< wedge image dis
67.6 ✓
67.8 ✓
135.4 ✓
0.87

see note
* Index above

55.7
123.9
231.9
297.4

68.2 ✓
65.5 ✓
133.7 ✓
0.90 ✓

see note
* 1.0 left

52.7
120.0
232.3
300.2

67.3 ✓
67.9 ✓
135.2 ✓
0.87 ✓

0.90 ✓
0.87 ✓
0.87 ✓
0.65 ✓
4)3.29
- 0.82 ✓

139.7
211.5
318.5
32.8

* see note
~~83.5~~
~~140.6~~
~~212.7~~
~~325.2~~

~~107~~.1
71.8 ✓
74.3 ✓
146.1 ✓
0.65

* Note: Images have been too close together as seen in photometer: beginning at sets marked * obs.r had to set images one slightly above the other to get convenient separation

1.5 left

Index below				Index above			
** reading	2	131.2	wedge ange des ~~92.5~~	** reading	2	221.0	
"	3	223.7	~~93.1~~	"	3	313.2	~~92.2~~
"	4	309.6	~~185.6~~	"	4	40.5	~~94.7~~ 186.9
"	1	42.7	88.5 ✓	"	1	135.2	85.8 ✓
			85.9 ✓				87.3 ✓
			174.4 ✓				173.1 ✓
			0.11 ✓ **			**	0.13 ✓

1.5 right

314.9	82.3 ✓	0.13 ✓	47.2	79.3 ✓
37.2	81.3 ✓	.11 ✓	126.5	81.2 ✓
136.7	163.6 ✓	.31 ✓	227.0	160.5 ✓
218.0	0.31 ✓	.37 ✓	308.2	0.37 ✓
		4).92		
		- 0.23 ✓		

at this obs. went to Square to get something to eat.

* * note: obs made mistake at first of making wrong image disappear: corrected as above

2.0 right

Index below				Index above	
47.4	< shade glass [illegible] dis		reading 2	36.4	
125.2	77.8 ✓		3	138.8	79.0 ✓
226.6	78.6 ✓		4	218.5	79.7 ✓
305.2	156.4 ✓		1	317.4	158.7 ✓
	0.45 ✓				0.41 ✓

2.0 left

Index below			Index above	
319.0	76.0 ✓	0.41 ✓	230.9	72.3 ✓
35.0	80.1 ✓	45 ✓	303.2	76.8 ✓
137.7	156.1 ✓	.46 ✓	49.5	149.1 ✓
		.59 ✓		
217.8	0.46 ✓	4)1.91	126.3	0.59 ✓
		0.48 ✓		

2.5 left

Index below			Index above	
146.0	61.9 ✓		56.7	61.2 ✓
207.9	64.2 ✓		117.9	57.6 ✓
328.8	126.1 ✓		238.3	118.8 ✓
28.0	1.06 ✓		295.9	1.22 ✓
		1.22 ✓		
		.06 ✓		
		124 ✓		
		115 ✓		
		4)67		
		1.17 ✓		

2.5 right

Index below		Index above	
238.8	56.2 ✓	326.5	60.1 ✓
295.0	61.5 ✓	26.6	61.8 ✓
56.1	117.7 ✓	147.2	121.9 ✓
117.6	1.24 ✓	209.0	1.15 ✓

3.0 right

Index below			Index above	
62.5			152.6	
109.7	47.2 ✓		199.4	46.8 ✓
	47.5 ✓			49.7 ✓
242.9	94.7 ✓		332.7	96.5 ✓
290.4	1.79 ✓		22.4	1.74 ✓

3.0 left

~~24~~ 153.2	48.0 ✓		243.2	
201.2	49.1 ✓	1.79 ✓	291.7	48.5 ✓
	97.1 ✓	74 ✓		48.4 ✓
332.6			62.5	
	1.73 ✓	73 ✓		96.9 ✓
21.7		73 ✓	110.9	
		4) 19		1.73 ✓
		1.75 ✓		

3.5 left

Index below			Index above	
159.0	35.4 ✓		67.9	
194.4	38.7 ✓		105.1	37.2 ✓
	74.1 ✓			35.2 ✓
337.4			249.4	72.4 ✓
16.1	2.37 ✓	2.37 ✓	284.6	2.43 ✓
		.43 ✓		
		.36 ✓		
		.43		
		4) .159		
		2.40 ✓		

3.5 right

247.9			338.7	
283.6	35.7 ✓		14.9	36.2 ✓
	38.7 ✓			36.0 ✓
66.9	74.4 ✓		157.7	72.2 ✓
105.6	2.36 ✓		193.7	2.43 ✓

4.0 right
Index below

253.0
278.6 25.6 ✓
73.6 26.1 ✓
99.7 51.7 ✓
3.20 ✓

Index above read circle wrong direction?

162.4 ~~61.8?~~
188.0 ~~178.2?~~ ~~27.9?~~
179.7 26.6 ✓
342.9 27.2
10.1 53.8 ✓
3.11 ✓

4.0 left

253.7
280.4 26.7 ✓ 3.20 ✓
73.0 27.6 ✓ .11 ✓
100.6 54.3 ✓ .09 ✓
3.09 ✓ .06 ✓
4/ .46
3.12 ✓

164.3
190.4 26.1 ✓
342.0 28.9 ✓
10.9 55.0 ✓
3.06 ✓

4.5 left
Index below

166.0
18$\overset{6}{9}$.0 20.0 ✓
345.8 21.2 ✓
7.0 41.2 ✓
3.70 ✓

Index above

257.2
276.5 19.3 ✓
76.9 19.3 ✓
96.2 38.6 ✓
3.85 ✓

3.70 ✓
.85 ✓
.96 ✓
.90 ✓
4/ 3.41
3.85 ✓

4.5 right

76.9
~~166.8~~
95.9 19.0 ✓
257.7 17.7 ✓
275.4 36.7 ✓
3.96 ✓

166.8
185.6 18.8 ✓
347.7 18.9 ✓
6.6 37.7 ✓
3.90 ✓

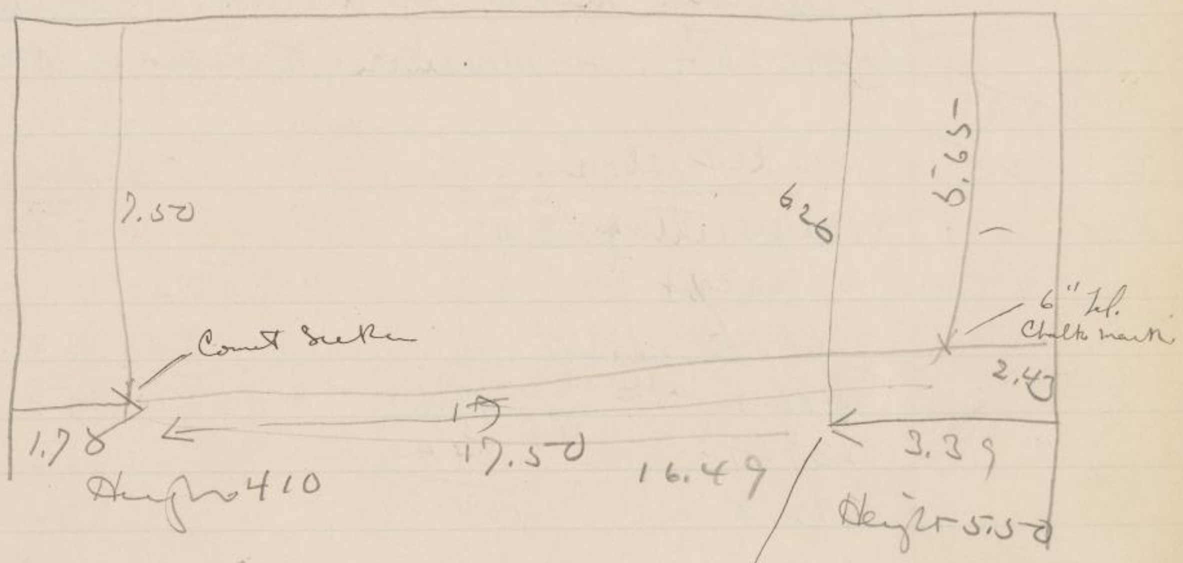
5.0 right

Index below		Index above	
259.6		169.2	
273.5	13.9 ✓	184.0	14.8 ✓
	14.0 ✓		14.4 ✓
79.4	27.9 ✓	349.6	29.2 ✓
93.4	4.56 ✓	4.0	4.46 ✓

5.0 left

169.4		4.56 ✓	259.5	
184.0	14.6 ✓	.46 ✓	273.4	13.9 ✓
	14.4 ✓	.48 ✓	79.4	14.3 ✓
348.9	29.0 ✓	.54 ✓		28.2 ✓
3.3		4 | 20 4	93.7	
	4.48 ✓	4.51 ✓		4.54 ✓

Positions of Tel. used to det. height of birds flight.



16.65 = dist between centres of oscillation

Point at which 6" was found.

Monday Sept 22 1902

Put off for measuring the Tel wedge in adjustment.

The measures to night are a repetition of the ones made by Mr Cram (see p 24) on Sept. 13th. Measures to night by Mr. Colson

12 25

Index above.		Index below	
wedge setting = 0.0 right			
61.4 < wedge image disappears.		22.5	
111.0	49.6 ✓	151.8	129.3 ✓
237.9	54.9 ✓	202.3	127.8 ✓
292.8	104.5 ✓	330.1	257.1 ✓
0.0 left			192.9 ✓
52.3		33.1	
120.5	68.2 ✓	145.9	112.8 ✓
234.8	67.0 ✓	212.0	112.6 ✓
301.8	135.2 ✓	* ~~2~~324.6	225.4 ✓
			134.6 ✓

1.55 ✓
1.59 ✓
0.87 ✓
0.88 ✓
~~6~~4.89 ✓
4 | 1.~~72~~22 ✓

* Assumed to be proper reading.

0.5

left

Index above		Index below	
59.6		24.9	
113.9	54.3 ✓	150.1	125.2 ✓
243.0	51.0 ✓	203.7	126.1 ✓
294.0	105.3 ✓	329.8	251.3 ✓
			108.7 ✓

right

		1.53 ✓		
54.1		1.45 ✓	29.0	
$\overset{1}{2}21.0$	$6\overset{6}{5}.9$ ✓	1.01 ✓	146.8	117.8 ✓
234.4	61.4 ✓	1.04 ✓	208.1	115.1 ✓
295.8	$12\underset{8}{7}.3$ ✓	4(1.03 ✓	323.2	232.9 ✓
		1.26 ✓		127.1 ✓

1.0

right

Index above		Index below	
45.0		38.3	
129.1	84.1 ✓	134.0	95.7 ✓
226.0	81.5 ✓	217.1	95.2 ✓
307.5	165.6 ✓	312.3	190.9 ✓
			169.1 ✓

left

		0.27 ✓		
		0.20 ✓		
67.2		2.25 ✓	19.1	
107.2	40.0 ✓	2.03 ✓	156.3	137.2 ✓
247.2	38.1 ✓	4(4.75 ✓	199.0	136.9 ✓
285.3	78.1 ✓	1.19 ✓	335.9	274.7 ✓
				85.9 ✓

By mistake the shade was left to left of wedge for all readings thus far ∴ shade was only in use when "right" readings were being made

1.5
left

Index above		Index below	
33.8		53.3	
142.8	.109.0 ✓	149.9	96.6 ✓
212.8	108.9 ✓	233.9	67.1 ✓
321.7	217.9 ✓	301.0	7

right

Hopeless.

36.9		50.1	
137.0	100.1	152.4	102.3
214.7	103.4	229.8	74.2
318.1	203.5	304.0	

2.0
right

Index above		Index below	
26.0		56.2	
147.1	121.1 ✓	115.1	58.9 ✓
206.7	119.5 ✓	238.6	57.4 ✓
326.2	240.6 ✓	296.0	116.3 ✓
	119.4 ✓		

left

40.0				43.0	
130.8	90.8 ✓	1.21	1.21 ✓	127.1	84.1 ✓
222.2	91.9 ✓	1.27	1.27 ✓	226.8	83.9 ✓
314.1	182.7 ✓	.05	−.05 ✓	310.7	168.0 ✓
	177.3 ✓	.23	−23 ✓		
		4 | 2.76	4 | 22+0 ✓		
		0.69	0.55 ✓		

2.5

left

Index above			Index below	
49.0			36.8	
126.8	77.8 ✓		137.0	100.2 ✓
229.3	77.6 ✓		217.3	98.1 ✓
306.9	155.4 ✓		315.4	198.~~2~~3 ✓
				161.~~8~~7 ✓
		0.47 ✓		
right		0.35 ✓		
18.9		1.87 ✓	64.4	
153.8	134.9 ✓	2.00 ✓	108.2	43.8 ✓
200.2	133.3 ✓	4) 4.69 ✓	246.0	43.1 ✓
333.5	268.2 ✓	1.17 ✓	289.1	86.9 ✓
	91.8 ✓			

3.0

right

Index above			Index below	
16.2			68.1	
158.9	142.7 ✓		104.9	36.8 ✓
193.9	145.4 ✓		248.9	35.1 ✓
339.3	288.1 ✓		284.0	71.9 ✓
	71.9 ✓			
left		2.44 ✓		
54.1		2.44 ✓	30.1	
120.3	66.2 ✓	0.96 ✓	144.2	114.1 ✓
233.0	64.9 ✓	0.92 ✓	210.0	113.2 ✓
297.9	131.1 ✓	4) 6.76 ✓	323.2	227.3 ✓
		1.69 ✓		132.7 ✓

3.5
left

Index above			Index below	
62.7			20.0	
111.0	48.3 ✓		153.8	133.8 ✓
242.0	49.4 ✓		199.1	133.4 ✓
291.4	97.7 ✓		332.5	267.2 ✓
				92.8 ✓

right

		1.71 ✓		
		1.84 ✓		
10.9		3.11 ✓	74.8	
163.3	152.4 ✓	3.31 ✓	99.1	24.3 ✓
190.0	153.9 ✓	4/9.97 ✓	255.2	24.9 ✓
343.9	306.3 ✓	2.49 ✓	280.1	49.2 ✓
	53.7 ✓			

4.0
right

Index above			Index below	
9.2			76.7	
167.7	158.5 ✓		96.9	20.2 ✓
186.0	159.8 ✓		259.7	1~~7~~6.6 ✓
345.8	318.3 ✓		276.3	3~~7~~6.8 ✓
	~~5~~41.7 ✓			

left

		3.~~20~~68 ✓		
		3.~~89~~95 ✓		
66.8		2.18 ✓	16.4	
105.9	39.1 ✓	2.1~~4~~1 ✓	155.0	138.6 ✓
245.9	41.3 ✓	4/11.~~47~~97 ✓	197.2	138.7 ✓
287.2	80.4 ✓	2.~~85~~98 ✓	335.9	277.3 ✓
				8~~7~~2.7 ✓

4.5
left
Index above — Index below

73.2 — 10.0
101.2 28.0 ✓ — 161.6 151.6 ✓
253.2 28.0 ✓ — 192.0 149.2 ✓
281.2 56.0 ✓ — 341.2 300.8 ✓
59.2 ✓

3.02 ✓
2.89 ✓
~~3.90~~ 4.58 ✓
4.59 ✓
4)1~~7.40~~ 15.08 ✓
3.~~60~~ 77 ✓

right

3.8 — 79.7
170.0 166.2 ✓ — 93.6 13.9 ✓
183.1 166.1 ✓ — 259.9 13.7 ✓
349.2 3~~2~~32.3 — 273.6 27.6 ✓
~~3~~27.7

5.0
right
Index above — Index below

1.9 — 80.9
172.1 170.2 ✓ — 92.0 11.1 ✓
181.9 170.1 ✓ — 261.9 10.1 ✓
352.0 340.3. ✓ — 272.0 21.2 ✓
19.7 ✓
left

5.32 ✓
5.16 ✓
3.75 ✓
3.~~81~~ 76 ✓
4/1~~8.04~~ 17.99 ✓
4.~~51~~ ~~4~~ 50 ✓

77.1 — 6.8
97.0 19.9 ✓ — 167.3 160.5 ✓
256.5 20.5 ✓ — 186.7 1~~60~~59.3 ✓
277.0 40.4 ✓ — 346.0 3~~20~~19.8 ✓
~~39.2~~ 40.2 ✓

18 45

Left group difficult on account of faintness of images.

Tuesday Sept 23 1902

Measurement of wedge of Hor. Tel.
Same apparatus as ~~[illegible]~~ used on previous occasions. Comparisons are with shade glasses used before. See p. 24.
When setting is 2.50 the point measured is opposite 0.60
Left in field corresponds to right aperture.

Index above

3.21 0.0 Right.

59.3
~~113.4~~

113.4 54.1 ✓ ⇐ Left diss
242.2 48.8 ✓
291.0 102.9 ✓

Index below.

329.2
22.8 ← Left diss 53.6 ✓
148.6 55.4 ✓
204.0 109.0 ✓

1.59 ✓
1.44 ✓
2.95 ✓
2.92 ✓
4)8.90 2 +2
2.2 –

0.0 Left

252.0
Right diss 281.0 29.0 ✓
72.1 28.6 ✓
100.7 57.6 ✓

163.3
Right diss 191.2 27.9 ✓
340.9 30.5 ✓
11.4 58.4 ✓

Index above   Index below.

0.5 left

153.9   64.8

Right diss   197.4   43.5 ✓   R. diss   104.7   39.9 ✓

336.6 $3\overset{8}{9}.8$ ✓   248.3   36.8 ✓

15.4 $.8\overset{2}{3}.3$ ✓   285.1   76.7 ✓

2.13 ✓
2.29 ✓
0.89 ✓
0.85 ✓
4 | 6.16
— 1.54 ✓

0.5 Right

324.7   232.0

L. Diss   29.3   64.6 ✓   L. Diss 300.5

142.3   69.5 ✓   53.7   68.5 ✓

211.8   134.1 ✓   121.6   67.9 ✓

136.4 ✓

Index above   Index below

1.0 Right

131.2   0.14 ✓   41.4

R. Diss   225.6   94.4 ✓   0.05 ✓   R. Diss 133.5   92.1 ✓

1.67 ✓

310.5   93.1 ✓   1.62 ✓ ✓   222.7   90.5 ✓

43.6   187.5 = 172.5 : 4 | 3.48 ✓   313.2   182.6 ✓

— 0.87   177.4R

1.0 Left.

60.9   329.7

R. Diss   111.6   50.7 ✓   20.0   R. Diss

242.5   48.9 ✓ $5\overset{0}{9}.3$ ✓

151.1   51.2 ✓

291.4   99.6 ✓   202.3   101.5 ✓

Photographic shade not used after the joint
+ in dip alone

In dip below

1.5 Left

325.0

R. 10 ins. 33.7 68.7✓

142.8 65.0✓

207.8 133.7✓

0.90 184
0.94 93
−0.29 4)91
−0.64 +.23
4)2.73.7 −.23
6.92

233.8

297.2 R. 10 ins 63.4✓

53.1 68.3✓

121.4 131.7✓

1.5. Right

125.3 assume 233.7

L. 10 ins 213.7 18 assume. 8.4✓

304.5 10~~8~~6.9✓

51.4 195.3✓
264.3
144.7

Then we take 215.3
1~~5~~44.7

✓ −0.90 184
− 0.94 13~~8~~2
+ 0.69 0.5~~4~~2
+ 0.64
4)−0.5~~6~~2
−0.1~~3~~

34.5

139.4 L. 10 ins 104.9✓

212.5 108.5✓

321.0 213.4✓
146.6

In dip alone

In dip below

2.0 Right

30.0

Left 10 ins 147.1 117.1✓

208.3 118.4✓

326.7 235.5✓
1~~3~~4.5
2

*+ −
+ *

0.19 0.16
1.02 0.36
−1.91 +0.52
52
4)−1.39
−0.37

298.0

56.3 L. 10 ins

113.7 118.3✓

237.2 1~~8~~3.5✓
2

241.8✓
1~~8~~8.2
1

2.0 Left.

365.2

L. 10 ins 44.9 99.7✓

~~2~~27.2 99.0✓

226.2 198.7✓
1~~7~~1.3
6

+
1.10
1.23
2.33
72
4)1.61
+0.40 +1

0.36
0.36
0.72

216.3

314.6 L. 10 ins 98.3✓

36.0 100.5✓

136.5 198.8✓
161.2

Index above

2.5 Left

$\overset{2}{3}25.0$

L. Wires
305.3　80.3 ✓　0.28 ✓
43.4　85.1 ✓　0.31 ✓
128.5　165.4 ✓　1.89 ✓
1.90 ✓
4) 4.38 ✓ -2
1.20

2.5 Right

R. Wires
61.3
108.1　46.8 ✓
244.0　44.0 ✓
288.0　90.8 ✓

Index below

137.9
217.2 L. Wires
315.1　79.3 ✓
39.5　84.4 ✓
163.7 ✓

335.1
20.0 R. Wires
154.0　44.9 ✓
199.7　45.7 ✓
90.6 ✓

Index above

3.0 Right

Raiss
338.5
15.1　36.6 ✓
158.9　37.8 ✓　2.36 ✓
196.7　74.4 ✓　2.38 ✓
~~285.0~~　0.93 ✓
0.97 ✓
4) 6.64 ✓
1.66

3.0 Left.

L. Wires
144.0
208.7　64.7 ✓
321.7　67.7 ✓
29.4　132.4 ✓

Index below.

247.4
285.0 R. Wires
37.6 ✓
67.0　36.4 ✓
103.4　74.0 ✓

55.3
L. Wires
119.4
233.3　64.1 ✓
299.8　66.5 ✓
130.6 ✓

Index above

3.5 Left
58.5
L. 10 ins
113.3 54.8 ✓
237.0 55.3 ✓
292.3 110.1 ✓

1.42 ✓
1.56 ✓
3.33 ✓
3.30 ✓
4) 9.61 ✓
2.40 ✓

Index below
328.2
21.0
151.9
202.9
L. 10 ins
52.8 ✓
51.0 ✓
103.8 ✓

3.5 Right
255.2
R. 10 ins
279.6 24.4 ✓
73.8 24.4 ✓
98.2 48.8 ✓

162.8
189.0
345.3
8.4
R. 10 ins
26.2 ✓
23.1 ✓
47.3 ✓

Index above
4.0 Right
166.7
R. 10 ins
183.8 17.1 ✓
347.8 16.0 ✓
3.8 33.1 ✓

4.19 ✓
4.09 ✓
2.13 ✓
2.12 ✓
4) 12.53 ✓
3.13

Index below
76.8
95.0
259.4
275.8
R. 10 ins
18.2 ✓
16.4 ✓
34.6 ✓

4.0 Left
335.5
L 10 ins
14.4 38.9 ✓
154.7 43.3 ✓
198.0 82.2 ✓

246.7
287.0
64.6
106.7
L 10 ins
40.3
42.1 ✓
82.4 ✓

Index above — Index below

4.5 Left.

251.2 — 163.8

L. Weiss — 282.0 $3\overset{0}{\cancel{7}}.8$ ✓ 2.73 ✓ — 192.3 L. Weiss 28.5 ✓

70.0 32.6 ✓ 2.89 ✓ — 340.2 30.6 ✓

102.6 63.4 ✓ 4.70 ✓ — 10.8 59.1 ✓

4.62 ✓

$4)\,1\overset{4}{\cancel{6}}.9^{2}4$ ✓

3.74 ✓

4 5 Right

80.4 — 349.8

R. Weiss — 93.1 12.7 ✓ — 3.7 R. Weiss 13.9 ✓

260.5 13.5 ✓ — 170.0 13.3 ✓

274.0 26.2 ✓ — 183.3 27.2 ✓

Index above — Index below

5.0 Right

169.3 — 79.3

R. Weiss — 183.2 $\overset{1}{\cancel{2}}3.9$ ✓ 4.64 ✓ — 93.4 R. Weiss

Image very faint — 350.5 13.0 ✓ 4.51 ✓ — 260.0 14.1 ✓

3.5 26.9 ✓ 4.45 ✓ — 274.5 14.5 ✓

4.29 ✓ — 28.6 ✓

$4)\,17.8^{2}9$ ✓

4.47 ✓

5.0 Left.

349.0 — 78.8

L. Weiss — 3.2 14.2 ✓ — 95.2 L. Weiss

168.8 15.2 ✓ — 259.6 16.4 ✓

184.0 29.4 ✓ — 274.8 15.2 ✓

31.6 ✓

5 30 approx

See note next page

Tuesday Sept 23 1902

Found tube bearing double image prism & Nicol drawn out so that images were very close together. This accounts for difficulty of the sort noticed this P.M.

10 07 Shade glass used for Comparison
Left aperture
Index up Index down

left disc 72.7 344.8
99.5 26.8 ✓ 8.6 23.8 ✓
255.2 2$\overset{2}{\cancel{3}}$.8 ✓ 164.4 24.4 ✓
278.0 $\underset{49}{\cancel{50}}$.6 188.8 48.2 ✓

Right aperture
255.7
277.7 22.0 ✓
74.5 24.3 ✓
98.8 46.3 ✓

3.44 ✓ 3.25
3.35 ✓
3.62 ✓
3.69 ✓
4| 2| 0 ✓ 4.9 / 05
3.52

Same right.
165.0 76.1
187.2 22.2 ✓ 96.9 20.8 ✓
346.5 20.6 ✓ 257.2 20.7 ✓
7.1 42.8 ✓ 277.9 41.5 ✓

Another set of shades -
Index ~~upper~~ lower   Index ~~lower~~ upp.

Right.

76.7		346.4	
96.7	20.0 ✓	6.5	20.1 ✓
257.2	19.5 ✓	165.8	19.2 ✓
276.7	39.5 ✓	185.0	39.3 ✓

3.79 ✓
3.81 ✓
3.61 ✓
3.46 ✓
4) 267
3.67 ✓

Same left.

345.8		255.0	
7.8	22.0 ✓	277.4	22.4 ✓
166.2	20.9 ✓	75.1	23.6 ✓
187.1	42.9 ✓	98.7	46.0 ✓

3.67
3.52
7.19

10.45

The two sets of shades measured above were used in combination for experiment with slit spectroscope on Sun recently.

In both cases the shades were placed against a piece of glass which covered the aperture in the standard used for measuring the [illegible] wedges.

Thursday Sept 25 1902

Measures of Mr Reeds wedges made with same app. as used for wedge of 8in tel. except stand, & one piece of ground glass added below light of pinholes. The colored shade used for comparison is also omitted
Wedge is about 11 cm from pinholes
Part off 60.0 is measured when setting is $\frac{60.0}{42.4}$
17.6

Index up   Index down

4.06 60. Right.

	172.3			81.4	
R. Diss —	181.4	9.1 ✓	5.62 ✓	90.4 ← R. Diss	9.0 ✓
	352.5	8.1 ✓	5.63 ✓	263.0	8.1 ✓
	0.6	17.2 ✓	6.21 ✓	271.1	17.1 ✓
			6.25 ✓		
			4) 23.71 ✓		
			5.93 ✓		

60. Left

	353.3		262.9 ← L Diss	
L Diss —	359.5	6.2 ✓	269.7	6.8 ✓
	173.3	6.9 ✓	83.5	6.1 ✓
	180.2	13.1 ✓	89.6	12.9 ✓

Index up — Index down

55 Left

L. Divs
262.7
270.1 — 7.4 ✓
83.4 — 6.4 ✓
89.8 — 13.8 ✓

173.4
180.3 — L. Divs — 6.9 ✓
352.8 — 6.8 ✓
359.6 — 13.7 ✓

6.10 ✓
6.11 ✓
5.74 ✓
5.64 ✓
4) 23.49 ✓
5.87 ✓

55 Right

R. Divs
82.7
90.6 — 7.9 ✓
262.7 — 8.4 ✓
271.1 — 16.3 ✓

352.3
1.2 — R. Divs
172.2 — 8.9 ✓
181.1 — 8.9 ✓
17.8 ✓

50 Right up — Index down

R. Divs
352.1
1.1 — 9.0 ✓
171.5 — 10.4 ✓
181.9 — 19.4 ✓

262.2
271.4 — R. Divs — 9.2 ✓
80.8 — 11.0 ✓
91.8 — 20.2 ✓

5.36 ✓
5.27 ✓
5.75 ✓
5.90 ✓
4) 22.28 ✓
5.57

50 Left. — Index up

L. Divs
172.6
180.5 — 7.9 ✓
352.3 — 8.3 ✓
0.6 — 16.2 ✓

83.4
90.7 — L. Divs — 7.3 ✓
262.6 — 7.8 ✓
270.4 — 15.1 ✓

Index up — Index down

45 Left

81.3 — 351.6

L 20 mins — 92.0 10.7 ✓ — 1.3 — L 20 mins 9.7 ✓

261.7 9.4 ✓ — 5.28 ✓ — 172.0 — 10.6 ✓

271.1 20.1 ✓ — 5.26 ✓ — 182.6 — 20.3 ✓

4.73 ✓

45 Right — 5.17 ✓

261.1 — 4)20.44 ✓ — 171.6

R. 20 mins — 273.4 12.3 ✓ — 5.11 ✓ — 181.8 — R. 20 mins

79.5 13.6 ✓ — 351.5 — 10.2 ✓

93.1 25.9 ✓ — 2.4 — 10.9 ✓

21.1 ✓

Index up. — Index down

40 Right

168.2 — 78.3

R. 20 mins — 184.3 16.1 ✓ — 94.3 — R. 20 mins

348.7 15.8 ✓ — 258.6 — 16.0 ✓

4.5 31.9 ✓ — 275.0 — 16.4 ✓

32.4 ✓

4.27 ✓

40 Left — 4.23 ✓

350.3 — 4.67 ✓ — 260.3

L 20 mins — 3.3 13.0 ✓ — 4.60 ✓ — 273.1 — L 20 mins

177.2 13.5 ✓ — 4)17.77 ✓ — 79.7 — 12.8 ✓

183.7 26.5 ✓ — 4.44 ✓ — 94.3 — 14.6 ✓

27.4 ✓

Photographic shade used

Index up.

35 Left

257.5

L. Divs

275.8   18.3 ✓

78.2   18.1 ✓

96.3   36.4 ✓

35 Right

75.8

R. Divs

94.6   18.8 ✓

256.6   18.4 ✓

275.0   37.2 ✓

3.98 ✓
3.95 ✓
3.93 ✓
3.69 ✓
4)15.55 ✓
3.89 ✓

Index down

167.9

185.8 } L Divs

345.9   17.9 ✓

4.9   19.0 ✓

36.9 ✓

345.8

R. Divs

6.0

165.5   20.2 ✓

186.8   21.3 ✓

41.5 ✓

Index above

3.0 Right

164.0

R Divs

188.0   24.0 ✓

343.6   23.8 ✓

7.4   47.8 ✓

3.37 ✓
3.28 ✓
3.53 ✓
3.53 ✓
4)13.71 ✓
3.432557

Index below

73.4

98.3   R Divs

254.4   24.9 ✓

279.4   25.0 ✓

49.9 ✓

30 Left

345.0

L. Divs

6.4   21.4 ✓

164.4   23.2 ✓

187.6   44.6 ✓

277.5

L Divs

74.6   21.8 ✓

97.3   22.7 ✓

44.5 ✓

Index above

25 Left

L. 10 ins

253.1
280.2 27.1 ✓
72.8 27.3 ✓
100.1 54.4 ✓

Index below

161.7 L. 10 ins
190.1
341.7 28.4 ✓
9.1 27.4 ✓
55.8 ✓

3.08 ✓
3.02 ✓
2.87 ✓
2.76 ✓
4 | 11.73 ✓
2.93 ✓

2.5 Right

R. 10 ins

69.9
100.8 30.9 ✓
251.1 28.8 ✓
279.9 59.7 ✓

339.5 R. 10 ins
11.6
161.0 32.1 ✓
191.5 30.5 ✓
62.6 ✓

Index above

20 Right

R 10 ins

333.2
17.8 44.6 ✓
154.0 43.8 ✓
197.8 88.4 ✓

Index below

246.8
286.5 R. 10 ins
63.0 39.7 ✓
108.2 45.2 ✓
84.9 ✓

1.96 ✓
2.05 ✓
2.36 ✓
2.20 ✓
4 | 8.57 ✓
2.14 ✓

20 Left

L 10 ins

157.7
195.3 37.6 ✓
336.4 37.0 ✓
13.4 74.6 ✓

63.7
105.7 L 10 ins
247.5 42.0 ✓
285.3 37.8 ✓
79.8 ✓

Index above

15 Left

L. 20 ins

57.7
112.4 54.7 ✓
238.0 58.0 ✓
296.0 112.7 ✓

Index below

L. 20 ins

327.4
21.0
148.3
~~347.6~~
$20\overset{1}{4}.\overset{5}{3}$

53.6 ✓
53.2 ✓
106.8 ✓

1.36 ✓
1.49 ✓
1.11 ✓
1.27 ✓
4)5.23 ✓
1.31 ✓

15 Right

R. 20 ins

235.3
298.0
53.6 62.7 ✓
124.5 60.9 ✓
123.6 ✓

R. 20 ins

144.5
204.0
328.6 59.5 ✓
25.8 57.2 ✓
116.7 ✓

Index above

10 Right

R. 20 ins

142.4
210.8
320.0 68.4 ✓
31.2 71.2 ✓
139.6 ✓

Index below

R 20 ins

48.4
120.5
231.5 72.1 ✓
297.4 65.9 ✓
138.0 ✓

0.78 ✓
0.81 ✓
0.95 ✓
0.92 ✓
4)3.46
0.86 ✓

10 Left

L 20 ins

323.8
26.8 63.0 ✓
142.3 68.2 ✓
210.5 131.2 ✓

L 20 ins

231.2
299.0
52.5 67.8 ✓
117.3 64.8 ✓
132.6 ✓

Image above

5 Left

227.2

L. 10 ins

304.6 77.4 ✓

50.2 74.1 ✓

124.3 151.5 ✓

0.55 ✓

0.58 ✓

0.36 ✓

0.20 ✓

4| 1.69 ✓

0.42

Image below

348.2

L. 10 ins

33.0

138.5 74.8 ✓

213.5 75.0 ✓

149.8 ✓

5 Right

225.2

R. 10 ins

305.4 80.2 ✓

45.9 81.1 ✓

127.0 161.3 ✓

130.6

R. 10 ins

218.1

313.0 87.5 ✓

34.6 81.6 ✓

169.1 ✓

Index above

0. Right

135.0

R. 10 ins

216.7 81.7 ✓

315.0 83.7 ✓

38.7 165.4 ✓

0.28 ✓

0.33 ✓

0.42 ✓

0.64 ✓

4| 1.67 ✓

0.42 ✓

Index below

43.9

R. 10 ins

125.1

227.0 81.2 ✓

308.6 81.5 ✓

162.7 ✓

0 Left

313.5

L. 10 ins

32.1 78.6 ✓

135.1 79.6 ✓

214.6 168.1 ✓

228.3

L. 10 ins

301.7

47.1 73.4 ✓

120.3 73.2 ✓

146.6 ✓

5.52

Friday Sept 26, 1902.

Measures of Mr Reeds shade glass with same apparatus as used by Mr King (p 46, Sept 25th)

Measures to night by Mr Colson.

12 50

Wedge setting = 60.0
Wedge to right.

Index above			Index below		
*171.6 < image to right dis.			81.0 < r. dis.		
179.2	7.6 ✓		89.1	8.1 ✓	
351.7	7.4 ✓		262.0	7.1 ✓	
	15.0 ✓	5.92		15.2 ✓	5.89
359.1			269.1		

Left

* 82.0		171.8	
left dis > 89.0	7.0 ✓	l. dis > 179.6	7.8 ✓
261.9	7.0 ✓	351.5	6.8 ✓
268.9	14.0 ✓		14.6 ✓
		358.3	

* Changed focus very slightly just preceding this reading.

5.92 ✓
5.89 ✓
6.07 ✓
5.98 ✓
4) 23.86 ✓
5.96 ✓

55

Left

	Index above		Index below	
left dir >	82.0		171.0	
	89.2	7.2 ✓	> 179.8	8.8 ✓
	261.8	7.1 ✓	351.9	7.0 ✓
	268.9	14.3 ✓	358.9	15.8 ✓

Right

right dir >	170.5		✓ 88.8	
	178.9	8.4 ✓	80.7	8.1
	350.9	8.0 ✓	261.6	7.5 ✓
	358.9	16.4 ✓	269.1	15.6 ✓

6.02 ✓
5.80 ✓
5.72 ✓
5.83 ✓
4)23.37 ✓
5.84 ✓

50

Right

	Index above			Index below	
left dir >	0.0^{4}		right dir >	80.1	
	170.2^{1}	9.0 ✓		89.3	9.2 ✓
	179.2^{2}	10.0 ✓		261.0	9.0 ✓
	350.0^{3}	19.0 ✓		270.0	18.2 ✓

Left

left dir >	80.8		left dir >	171.1	
	89.2	8.4 ✓		179.2	8.1 ✓
	260.8	8.4 ✓		350.9	8.0 ✓
	269.2	16.8 ✓		358.9	16.1 ✓

5.40 ✓
5.50 ✓
5.67 ✓
5.76 ✓
4)23.33 5.58
~~5.88~~

45
Left.

Index above

left > 79.7
89.9 10.2✓
259.5 10.7✓
270.2 20.9✓✓

Index below

right > 0.1
169.5 169.4 ✓
180.2 168.9
349.1 338.3✓

10.7
11.0
21.7

Right

left dir > 1.8 ~~0.1~~
169.1 167.3
180.2 168.7
348.9 336.0✓
-24.0

11.1
12.9
24.0

5.19
5.11
4.89
4.97
4|20.17
5.04

right dir > 79.0
90.7 11.7✓
259.7 11.5✓
271.2 23.2✓

+5.19
+4.97
10.16

-4.89
-5.11
10.00

mean =10.16
+0.04

40
Right

Index above

~~right~~ left dir > 4 2.2
1 167.8 165.6
2 181.8 165.2 -29.2
3 347.0 330.8✓

14.0
15.2
29.2

Index below

right > 77.0
91.9 14.9 ✓
258.0 13.3 ✓
271.3 28.2 ✓✓

Left

left dir > 78.0
93.0 15.0 ✓
(272.0 14.8 ✓ ~~5.2~~
257.2 29.8 ✓✓

right dir > 4 2.0
1 167.2 165.2
2 183.2 164.7
3 347.9 329.9 -30.1

16.0
14.1
30.1

-4.45
-4.39
-8.84

+4.54
+4.42
+8.96

4.46
4.54
4.42
4.40
4|17.82
4.46

+0.12

+ 0.03

Sunday Sept 28. 1902

Continuation of work on previous page.

35

Left

12 45 Index above Index below

left dis > 84.4 right dis 4 11.7
103.0 18.~~1~~6 ✓ 1 174.2 163.5 16.6
264.9 15.6 ✓ 2 190.8 164.2 16.7
280.5 34.2 ✓ -3 355.0 326.7 ✓ 33.3

+4.12
+3.61
+7.73

Right

left dis. > 4 13.1 right dis 82.9
1 168.7 ~~155.6~~ 104.8 21.9 ✓
2 194.3 ~~155.8~~ 25.6 261.0 21.0 ✓
3 350.1 311.4 ✓ 23.0 282.0 42.9 ✓ ✓
48.6

-3.33
-4.17
-8.50

4.11
4.17
3.33
3.61
4)15.32 2
3.80

30

-0.77

-0.19

Right

left dis > 4 15.7 78.8
1 165.7 ~~150.0~~ 31.1 107.7 28.9 ✓
2 196.8 ~~150.2~~ 28.7 258.4 26.5 ✓
3 347.0 306.2 -59.8 59.8 284.9 55.4 ✓ +3.04

+4.02
+7.06

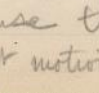
Left

left dis > 82.2 4 15.0 18.7
102.5 20.3 ✓ 1 174.2 159.2 22.5
268.2 15.4 ✓ 2 192.9 159.6 41.2
283.6 35.7 ✓ 3 352.5 318.8 -41.2

2.87
3.04
4.02
3.70
4)13.63
3.41

2.87
3.70
-6.57
+0.49
+0.12

It is very difficult to get satisfactory measures as the images apparently shine through an aperture, thus



A very slight motion of the head will cause the image to disappear behind one of the bars, and the slightest motion of the head will

25

Left

	Index above				Index below		
left dis >	79.0			left dis >	350.0		
	104.8	25.8 ✓			15.9	25.9 ✓	3.17
	260.2	26.6 ✓			169.3	21.5 ✓	3.39
	286.8	57.4 ✓✓			190.8	47.4 ✓✓	

Right

right dis >	~~75.0~~ 23.2 4			75.0		3.17
	~~112.0~~ 164.0 1	149.8 ✓	31.4	112.0	~~135.0~~ 37.0 ✓	3.39
	~~256.0~~ 195.4 2	152.7	35.1	256.0	33.8 ✓	2.62
	~~289.8~~ 348.1 3	293.5 ✓	66.5	289.8	70.8 ✓	2.48
						4) 11.66
						2.92

20

Right

> 4 25.8				right >	69.2	
1 158.0	132.2		46.6		116.8	47.6 ✓
2 204.6	135.6 ✓	92.2	45.6		250.2	45.7 ✓
3 340.2	267.8		92.2		295.9	93.3 ✓

Left

left dis >	75.0		4 23.0			1.86
	111.1	36.1 ✓	1 164.0	141.0 ✓		1.83
	253.1	35.0 ✓	2 200.8	143.9 ✓✓		2.47
	288.1	71.1 ✓	3 344.7	284.9	75.1	2.34
						4) 8.50
						2.12

36.8
38.3
75.1

-1.86
-2.34
-4.20

+1.83
+2.47
+4.30

+.10

+0.02

cause the image to change in brightness.

15

Left

left > 4 61.8
1 245.8 ~~184.0~~
2 299.0 ~~172.2~~
3 61.2 ~~356.2~~

?

.1

left > 157.8
208.4 ~~60.6~~ ✓
333.0 × ~~61.3~~ ✓
34.3 ~~111.9~~ ✓

123.5
124.6
248.1

Right

53.2 ✓
53.2 assumed
106.4

left > 4 35.2
1 153.4 ~~119.2~~
2 213.8 ~~119.5~~
3 333.3 ~~237.7~~ √

60.4
61.9
122.3

left > + 127.9
1 242.2
2 297.9
3 61.3

~~114.3~~
~~123.4~~
~~237.7~~

6.6

55.7
66.6
122.3

1.50
1.37
1.14
1.14
4)5.15
1.29

10

Right

Index above

left > 4 40.2
1 145.2 105.0
2 220.0 101.0 √
3 321.0 206.0 -154.0

74.8
79.2
154.0

Left

left 62.1
126.1 64.0 ✓
242.0 60.0 ✓
302.0 124.0 ✓√

Index below

right > 54.6
132.9 78.3 ✓
233.8 77.5 ✓
311.3 155.8 √√

4 31.4
1 151.3 119.9
2 216.9 111.3 √
3 328.2 231.2 -128.8

65.6
63.2
128.8

-0.50
-1.00
-1.50

+0.46
+1.11
+1.57
+1.50
-1
0.07
4)0.07
0.02

0.50
0.46
1.11
1.00
4)3.07
0.77

5
Left

Index above — Index below

left > 60.4 right > 4 38.1
127.7 67.3 ✓ — 1 148.0 109.9 — 71.2
237.8 67.5 ✓ — 2 219.2 108.9 — 70.0
305.3 134.8 ✓✓ — 3 328.1 218.8 — 141.2 ✓
-141.2

Right

left > 4 45.0 51.2
1 145.2 100.2 +0.88 -0.19 132.5 81.3 ✓
2 225.2 90.0 +0.17 -0.75 227.2 89.7 ✓
198.2 +1.05 0.94 171.0 ✓✓
3 315.2 -169.8 ✓ -94 316.9
4 .11
+0.03 ✓

80.0
89.8
169.8

0.88
0.75
0.19
0.17
4) 1.99
~~0.4~~
0.50

Right

left > 4 46.2 51.0
1 136.6 90.4 88.7 — 136.1 85.1 ✓
2 225.3 95.6 85.3 — 228.0 84.6 ✓
174.0
3 320.9 186.0 ✓ — 312.6 169.7 ✓
-174.0

Left

53.0 — 4 > 37.8
130.7 77.7 ✓ -0.11 +0.20 1 147.3 109.5 70.6
.236.8 69.2 ✓ -0.71 +0.64 2 217.9 107.4 72.5
306.0 146.9 ✓ -0.82 +0.84 3 325.3 216.9 143.1
-0.82
4) 0.02
+0.00 ✓
-143.1 ✓

0.11
0.20
0.64
0.71
4) 1.66
0.42

50

Right

Index above

left dir → 4 7.2
1 178.0
2 187.8
3 357.8

170.8
170.0
340.8 ✓
-19.2

9.8
9.4
19.2

Index below

right → 87.4
97.0
268.8
277.3

9.6 ✓
8.5 ✓
18.1 ✓

Left

89.5
96.9
269.0
276.2

7.4 ✓
7.2 ✓
14.6 ✓

4 7.1
1 178.9
2 187.0
3 358.1

171.8
171.1
342.9
-17.1 ✓

8.1
9.0
17.1

17 50

-5.38
-5.63
-11.01

5.51
5.98
+11.49
11.01
4)0.48
+ 0.12 ✓

5.38
5.51
5.98
5.63
4)22.50
5.62

Monday Sept 29 1902

Measurement of Mr. Reed's wedge. Same app except ~~that~~ shade glasses will be used ~~is~~ over ~~[illegible]~~ apertures not covered by wedge.

Index up. Index down.

3 ~~46~~ 57 60 Left 346.6

Left dis. > 76.8 19.0 32.4 ✓

109.0 32.2 ✓ 167.2 31.8 ✓

257.2 31.0 ✓ 188.0 64.2 ✓

288.2 63.2 ✓

2.94 ✓
2.71 ✓
1.93 ✓
1.91 ✓
4 | 9.29 ✓
2.32 ✓

60 Right

Rt dis > 159.8 249.4

204.6 44.8 ✓ 296.3 46.9 ✓ First four

340.0 44.7 ✓ 70.5 43.2 ✓

24.7 89.5 ✓ 113.7 90.1 ✓

3 50
5.82

246.8

296.0 49.2 ✓

68.4 45.1 ✓

113.5 94.3 ✓

9.29
1.80 ✓
1.91 ✓
6) 13.00
mean of six 2.17 ✓

250.4

294.9 44.5 ✓

68.4 45.7 ✓

114.1 90.2 ✓

	Index up.		Index down.			
	55 right.					
Rt dis	157.5		68.9			
	207.0	49.5 ✓	113.9	45.0 ✓		
	336.7	49.2 ✓	250.1	47.~~8~~6 ✓		
	25.9	98.7 ✓	297.7	92.~~8~~6		

1.69 ✓
1.84 ✓
2.46 ✓
2.32 ✓
4 | 8.31 ✓
2.08
3.5
5.38

					Repeated	
	55 left					
	75.1		342.2		342.4	
Left dis	> 111.9	36.8 ✓	22.1	39.9 ✓	21.2	38.8 ✓
	253.2	34.7 ✓	167.9	34.6 ✓	164.6	37.2 ✓
	287.9	71.5 ✓	202.5	74.5 ✓	201.8	76.0 ✓

	50 left			
	73.5		160.5	
Left dis	> 114.0	~~3~~40.5 ✓	204.6	44.1 ✓
	251.6	42.5 ✓	340.6	43.8 ✓
	294.1	83.0 ✓	24.4	87.9 ✓

	50. right			
	337.8		67.6	
Rt dis	26.7	48.9 ✓	116.0	48.4 ✓
	158.4	49.6 ✓	248.6	47.2 ✓
	208.0	98.5 ✓	295.8	95.6 ✓

2.11 ✓
1.97 ✓
1.69 ✓
1.77 ✓
4 | 7.54 ✓
1.88
3.3
3.38

Index up,
45 right
328.6
Rt dis 34.0
150.9
212.5

65.4 ✓
61.6 ✓
127.0 ✓

Index down
242.3
301.2
59.0
122.8

58.9
63.8
122.7 ✓

1.04 ✓
1.13 ✓
1.51 ✓
1.54 ✓
4) 5.22 ✓
1.30 ✓
3.3
4.82

45 left,
68.6
122.4
246.8
299.2

53.8 ✓
52.4 ✓
106.2 ✓

158.1
208.3
336.0
30.4

50.2 ✓
54.4 ✓
104.6 ✓

40 left.
60.4
Lft dis 125.7
240.6
307.6

65.3 ✓
67.0 ✓
132.3 ✓

326.0
36.0
150.7
216.0

70.0 ✓
65.3 ✓
135.3 ✓

0.93 ✓
0.87 ✓
0.61 ✓
0.41 ✓
4) 2.82 ✓
+ 0.70
3.3
4.2 ✓

40 Right.
235.3
R. Discs 309.0
55.5
129.9

73.7 ✓
74.4 ✓
148.1 ✓

Index up
140.6 R. Discs
220.0
324.0
43.2

79.4 ✓
79.2 ✓
158.6 ✓

Index above

35 Right

R. Wires

317.0
48.4 91.4 ✓
138.0 87.5 ✓
325.5 178.9 ✓

35. Left

L. Wires

144.0
221.0 77.0 ✓
322.5 78.5 ✓
41.0 155.5 ✓

Index below

225.3 R. Wires
319.0
48.8 9~~4~~3.7 ✓
136.8 88.0 ✓
181.7 ✓
-178.3 ✓

52.8 L. Wires
134.0
232.6 81.2 ✓
310.3 77.7 ✓
158.9 ✓

+0.02 ✓
+0.47 ✓ +0.89 ✓
+0.40 ✓ -0.03 ✓
-0.03 ✓ 4|0.86 ✓
+0.22
3.5
3.72

Index above

30. Left

L. Wires

44.6
142.8 98.2 ✓
231.0 89.8 ✓
320.8 188.0 ✓
-172.0

Index below

312.8 L. Wires
46.6
139.0 93.8 ✓
227.0 88.0 ✓
181.8 ✓
-178.2 ✓

-0.15 ✓
-0.03 ✓
-0.29 ✓
-0.49 ✓
4|0.96 ✓
-0.24 ✓
3.5
3.26

30. Right

R. Wires

224.2
322.0 97.8 ✓
44.0 97.5 ✓
141.5 195.3 ✓
-164.7 ✓

133.7 R. Wires
233.6
310.4 99.9 ✓
56.0 105.6 ✓ ✓
205.5
-154.5 ✓

Index above

25 Right

R. Wires
126.9
237.5 110.6 ✓
306.8 110.6 ✓
57.4 221.2 ✓
-138.8 ✓

Index below

240.6
143.0
216.8
323.0

R. Wires
102.4 ✓
106.2 ✓
208.6 ✓
-151.4 ✓

-0.80 ✓
-0.55 ✓
-0.40 ✓
+0.37 ✓
4) 2.12 ✓
-0.53 ✓
3.3
2.97

25 Left

L. Wires
311.3
52.0 100.7 ✓
132.4 100.4 ✓
232.8 201.1 ✓
-158.9 ✓

219.0
315.8
43.2
145.7

L. Wires
96.8 ✓
102.5 ✓
199.3 ✓
-160.7 ✓

Index below.

Index above

20 Left

L. Wires
215.0
~~153.7~~
330.0 116.0 ✓
37.3 109.9 ✓
147.2 224.9 ✓
-135.1 ✓

301.3
59.5
122.8
241.2

L. Wires
118.2 ✓
118.4 ✓
236.6 ✓
-123.4 ✓

-0.87 ✓
-1.12 ✓
-1.26 ✓
-1.33 ✓
4) 4.58 ✓
-1.14 ✓
3.5
2.36

20 Right

R. Wires
~~27.5~~
29.4
152.3 122.9 ✓
213.7 120.0 ✓
333.7 242.9 ✓
-117.1 ✓

120.8
243.0
299.6
63.7

R. Wires
122.2 ✓
124.1 ✓
246.3 ✓
-113.7 ✓

Index above — Index below

15. Right

Photographic shade used

12 ins
113.5
250.6 137.1 ✓
293.6 141.6 ✓
75.2
276.7 ✓
−81.3 ✓

−2.16 ✓
−2.33 ✓
−2.02 ✓
−1.94 ✓
4)8.45 ✓
−2.11
3.5
1.39

199.6 R. 12 ins
341.0
22.2 1$\overset{4}{5}$1.4 ✓
165.3 143.1 ✓
284.5 ✓
−75.5 ✓

15 Left

L.
L 12 ins
292.5
67.6 1$\overset{3}{4}$5.4 ✓
114.5 138.8 ✓
253.3
273.9 ✓
−86.1 ✓

25.5 L. 12 ins
159.3
204.4 133.8 ✓
341.7 137.3 ✓
271.1 ✓
−88.9 ✓

I below

10. Left

L 10 ins
20.0
167.0 147.0 ✓
199.4 146.8 ✓
346.2
293.8 ✓
−66.2 ✓

−2.64 ✓
−2.81 ✓
−2.94 ✓
−3.11 ✓
4)11.50 ✓
−2.88 ✓
3.5
0.62

199.0 Left
257.8
287.5 148.8 ✓
77.5 150.0 ✓
298.8 ✓
−61.2 ✓

10 Right

R 10 ins
198.7
348.2 149.5 ✓
17.1 152.5 ✓
169.6
302.0 ✓
−58.0 ✓

286.4 R 10 ins
78.0
105.9 151.6 ✓
266.6 154.7 ✓
306.3 ✓
−53.7 ✓

Index above Index below

5 Right

286.8
R. 10 ins ~~8~~0.0
10~~4~~5.7 1~~8~~53.2 ✓
257.0 151.3 ✓ ✓
304.5 ✓
-55.5

155.6
170.2 154.6 ✓
193.9 ~~3~~56.7 ✓
350.6 311.3 ✓
-48.7 ✓

5 Left

L. 10 ins 107.2
258.2 151.0
286.1 152.0
78.1 303.0 ✓
-57.0 ✓

-3.04 ✓
-3.33 ✓
-2.98 ✓
-2.79 ✓
4)12.14 ✓
-3.04 ✓
3.1
10.46

197.8 L. 10 ins
3~~4~~8.2
17.8 150.4 ✓
165.4 147.6 ✓
298.0 ✓
-62.0 ✓

6:10

Wednesday Oct 22 1902

Measures of aperture (new) of Phot. D

No	Comp. (Phot. Meas' page 27)	cm.			Measures made with Steel rule Nov 15 1904
17	15.7	15.80	15.80		15.80
16	9.48	9.48	9.48		9.48
15	6.88	6.87	6.87		6.88
14	3.69	3.68	3.70	3.70	$\overset{3}{2}.70$
13	2.38	2.40	2.40		2.39
12	1.46	1.46	1.45		1.45
11	0.92	0.93	0.92		0.92
10	0.58	0.60	0.58	0.58	0.58

Measured dist. from film to face of aperture & found = 19.95 cm

Remeasured this value on Nov 15 1904 with steel rule & found it to be 20.05 cm ± 0.02 cm

Monday Oct. 27 1902

Measures of Mr. Reed's wedge with same apparatus as used for previous measures, but no adjustments.
Comparisons made with a bundle of shade glass used previously.

	Index up		Index down		
	~~60~~ 55 left.				
Time 7.47 L.D.	263.7		L.D 173.4		
	316.3	52.6 Reject.	224.1	50.7	
	86.1	44.9	354.4	49.9	
	131.0	97.5	44.3	100.6	δ
	55 ~~right~~ left (Repeated)				1.72
					1.64
	265.5				2.69
	311.6	46.1			2.81
	84.4	47.6			4) 8.86
	132.0	93.7			2.~~22~~ 24
					3.50
	55 right.				5.74
R.D.	181.3		R.D. 91.9		
	214.9	33.6	123.9	32.0	
	2.4	31.1	272.6	29.3	
	33.5	64.7	301.9	61.3	

Index Up.		Index Down.	
50 Right			
R.D. 357.8	38.1	R.D. 87.7	
35.9	~~321.9~~	125.7	38.0
180.0	34.8	272.1	31.1
214.8	72.9	303.2	69.1
		272	
50 Left			
L.D 254.8		L.D. 343.5	
312.5	57.7 57.7	48.2	~~295.3~~ 64.7
76.9	59.1 59.1	171.5	52.4
136.0	108.8 116.8	223.9	117.1
45 Left.			
L.D. 73.6		L.D. 341.6	
138.6	65.0	50.6	69.0
249.5	71.0	159.8	72.1
320.5	136.0	231.9	141.1
45 Right			
		R.D. 262.3	44.7
R.D. 168.3		307.0	43.9
217.1	48.8	82.8	
357.7	43.0	126.7	88.6
34.7	91.8		

(50)
2.41
2.54
1.26 ~~1.49~~
1.26
4)7.47
1.86
3.50
5.36

4)7.47
1.87
3.50
5.37

(45)
0.86
0.75
1.87
1.95
4)5.43
1.35
3.50
4.85

Index Up.

40 Right

R.D. 165.0
225.5
342.5
45.1

60.5 ✓
62.6 ✓
123.1 ✓

40 Left

L.D. 58.9
145.0
237.4
325.1

86.1 ✓
87.7 ✓
173.8~~8~~ ✓

35 Left.

L.D. 52.3
148.3
232.5
331.6

96.0 ✓
99.1 ✓
195.1 ✓

35 Right

R.D. ~~247.4~~
~~311.9~~

~~124.5~~ ~~64.5~~

~~R.D 157.6~~

R.D. 154.7
220.6
334.4
40.9

65.9 ✓
66.5 ✓
132.4 ✓

(40) 1.13 ✓
1.44 ✓
0.12 ✓
0.14 ✓
4/2.83 ✓
.70
3.50
4.20 ✓

Index Down.

R.D. 73.6
131.1
258.8
310.4

57.5 ✓
51.6 ✓
109.1 ✓

L.D. 148.3
237.2
328.3
57.7

88.9 ✓
83.4 ✓
172.3 ✓

L.D. 324.0
60.6
140.0
241.6

96.6 ✓
101.6 ✓
198.2 ✓

R.D. 67.0
130.9
244.7
314.1

63.9 ✓
69.4 ✓
133.3 ✓

(35) − 0.29 ✓
− 0.35 ✓
+ 0.93 ✓
+ 0.91 ✓
4/1.20 ✓
.30
3.50
3.80 ✓

	Index Up.			Index Down	
		30 Right			
~~Photo~~ R.D.	147.0		R.D.	~~50.8~~ 49.3	
	228.5	81.5 ✓		137.4	88.1 ✓
	325.0	82.3 ✓		234.8	78.0 ✓
	47.3	163.8 ✓		312.8	166.1 ✓
		30 Left.			
× L.D.	226.4		L.D.	311.4	
	325.0	98.6 ✓		57.3	105.9 ✓
	43.3	102.5 ✓		128.4	113.2 ✓
	145.8	201.1 ✓		241.6	219.1 ✓
		25 Left			
Photo. Shade. L.D.	211.3		L.D.	118.8	127.7 ✓
	330.0	123.7 ✓		246.5	121.9 ✓
	28.9	123.0 ✓		300.3	249.6 ✓
	157.9	246.7 ✓		62.2	
		25 Right			
R.D.	308.8		R.D.	42.0	
	45.9	97.1 ✓		138.0	96.0 ✓
	132.2	95.4 ✓		225.6	89.5 ✓
	227.6	192.5 ✓		315.1	185.5 ✓

(30)

0.31 ✓
0.26 ✓ 4/-0.57 ✓
-0.46 ✓ -0.14
-0.76 ✓ 3.50
3.36 ✓
-0.59 ✓
3.50
~~4.09~~
~~2.91~~

(25)

-1.34 ✓
-1.41 ✓
-0.24 ✓
-0.10 ✓
4/-3.09 ✓
-.77
3.50
2.73 ✓

Index Up.

20 Right

R.D. 362.4 — 109.6
52.0 — 107.4
125.0 — 217.0 ✓
232.4

20 Left.

L.D. 17.2
150.2 — 133.0
197.2 — 133.2
330.4 — 266.2 ✓

15 ~~Right~~ Left.

L.D. 190.0 — 146.8
336.8 — 149.0
8.0 — 295.8 ✓✓
157.0 — 64.2

15 Right

R.D. 102.6 — 133.3
235.9 — 129.5 ✓
284.5 — 262.8 ✓
54.0 — 97.2

(20)
−0.71 ✓
−0.6~~4~~6 ✓
−1.87 ✓
− 2.00 ✓
$4\,|\,\underline{5.1^{3}68}$
−1.29
3.50
2.21 ✓

Index Down.

R.D. 214.1 — 106.7
320.8 — 107.7
31.9 — 214.4 ✓
139.6

L.D. 287.0 — 137.6
64.6 — 135.5
108.0 — 273.1 ✓
243.5

L.D. 278.2 — 146.4
64.6 — 148.9 ✓
96.0 — 295.3 ✓
244.9 — 64.7

R.D. 17.0 — 128.0
145.0 — 124.2 ✓
198.6 — 252.2 ✓
322.8 — $\overset{1}{\cancel{3}}07.8$

15
− 2.71 ✓
− 2.69 ✓
− 1.73 ✓
− 1.47 ✓
$4\,|\,\underline{8.60}$ ✓
− 2.16
3.50
+1.35 ✓

Index Up.

10 Right.

R.D. 98.6
Assume 239.2
139.2
277.3 ✓
57.7

40.6
140.4
181.0 ✓

140.6
140.4
282.0
78.0 ✓

10 Left.

Index Down
L.D. 269.4
65.0
90.5
246.5

~~264.4~~
133.6
156.0
~~366.4~~
391.6 ✓

25.5
22.9
48.5

5 Left

× L.D. 357.6
156.0
179.0
336.0

23.0
21.6
44.6

158.4
~~201.6~~
257.0
~~458.6~~

158.4
157.0
315.4
144.6

5 Right

× R.D 270.6
555.0
93.3
235.2

37.8
35.4
73.2

44.9
~~215.1~~
141.9
186.8 ✓

144.9
141.9
286.8
73.2

10

- -0.02 (2.22) — -2.22
- -2.09 ✓ — -2.09
- -3.34 ✓ — -3.34
- -3.27 ✓ — -3.27

4|-8.72 — 4|-10.92

-2.18 — -2.76

3.56 — 3.50

1.32 — 4.76

Index Down

R.D. 188.0
327.0
10.4
147.8

139.0
137.4
276.4 ✓

42.4
40.2
82.6

Index Up.

L.D. 0.5
153.4
179.0
336.0

152.9
157.0
309.9 ✓

25.6
24.5
50.1

L.D. 87.6
246.2
266.7
64.7
424.7

20.5
22.9
43.4

158.6
158.0
~~360.6~~
316.6 ✓
43.4

R.D. 183.6
329.3
2.4
145.6

33.1
38.0
71.1

145.7
143.2
288.9 ✓

5

- -3.35 — -3.53
- -3.59 — -3.59
- -0.13 — -2.40
- -2.47 — -2.47

4|-9.54 — 4|11.99

-2.38 — ~~2.9~~ -3.00

3.50

1.12

Saturday ~~O~~ Nov 1 1902

Measures of Mr. Reed's wedge with same apparatus as last.

Wedge is about 13 cm from aperture. Bundle of shade glasses (same as used before of about 3.5 absorption), at about 4 cm from aperture

Wedge measured first in right aperture

	Index up		Index down	
8 27		55.0		
	157.8			
	191.0	33.2	Circle did not move freely.	
	338.5	30.0	Stopped and oiled. Began again	
	8.5	63.2		

8 37		55.0		
R. dis.	337.8		66.0	
	8.6	30.8	100.6	34.6
	158.5	30.1	247.5	31.2
	188.6	60.9	278.7	65.8

50.0 Found Nicol nearly free to move. ~~[illegible]~~ Wedged it in position.

~~332.4~~			
315.4		226.3	
354.0	38.6	264.0	37.7
136.4	37.7	46.9	35.2
174.1	76.3	82.1	72.9

Index up   Index down

45.0

131.5 ~~221.?~~		221.3	
179.4	47.9✓	269.3	48.0✓
311.0	46.2✓	43.9	45.8✓
357.2	94.1✓	89.7	93.8✓

40.0

127.3		214.2	
186.2	58.9✓	275.9	61.7✓
304.3	61.0✓	33.8	59.6✓
5.3	119.9✓	93.4	121.3✓

4:

35.0 At this point re-adjusted app. as images appeared dis. [illegible] at edge of field.

300.0		29.1 ~~212.0~~	
10.4	70.4✓	99.0 279.5	69.9✓
119.3	71.1✓	211.0 ~~30.6~~	70.6✓
190.4	141.5✓	281.6	140.5✓

Reject. 30.0 Plate Stationary.

292.8	~~8~~	203.5	
18.6	76.0	283.1	79.6
113.7	85.1	20.6	84.2
198.8	~~161.1~~ 171.1	104.8	163.8

30.0 Refocused without shade.

110.0		202.9	
198.0	88.0✓	290.0	87.1✓
291.8	85.2✓	20.9	84.4✓
17.8	~~163.2~~ 173.2✓	105.3	171.5✓

93.8
93.0
186.8
173.2

Index up Index down

~~29.0~~ 25.0

109.4			201.5			
202.6	93.2 ✓	87.4	290.0	88.5		88.5
290.0	92.2 ✓	87.2	18.5	95.3		87.7
22.2	185.4 ✓	174.6	113.8	183.8		176.2
	174.6 ✓			176.2 ✓		

20.0 Shade ? not used,

~~272.0~~ 77.6			189.3			
30.9	113.3	67.0	300.1	110.8	~~71.4~~	71.4
97.9	112.8	66.9	11.5	111.3	~~6.5~~	66.5
210.7	226.1	133.9	122.8	222.1		137.9
	133.9 ✓			137.9 ✓		

15.0

269.4			00.3			
38.1	128.7	52.8	131.0	130.7		50.9
90.4	130.0	49.0	181.9	129.8		48.6
220.4	258.7	101.3	311.7	260.5		99.5
	101.3 ✓			99.5 ✓		

10.0

~~84.2~~ 3.4			356.2			
227.2	143.8	36.4	136.3	140.1	~~40.3~~ 39.6	39.7
263.6	141.6	38.2	176.0	140.2	~~40.0~~	40.0
45.2	285.4	74.6	316.2	280.3	~~79.3~~	79.7
	74.6 ✓			79.7 ✓		
	520					

263.0			352.2			
49.5	146.5	33.8	138.8	146.6		33.8
89.3	144.8	34.9	172.6	145.5		34.1
228.1	291.3	68.7	315.1	292.1		67.9
	67.7 ✓ 8			67.9 ✓		

wedge now over left aperture
Shades in right

10 12

left dis.

Index up		Index down		
346.2	5.0			
145.8		76.7		
166.0	20.2 ✓	231.0	154.3	24.9 ✓
324.6	21.6 ✓	255.9	159.3	21.5 ✓
~~346.2~~	41.8 ✓			~~43.4~~
		55.2		46.4 ✓

	10.0		
167.2		258.0	
323.1	24.8 ✓	53.7	24.3 ✓
347.9	24.9 ✓	78.0	24.5 ✓
142.3	49.7 ✓	233.5	48.8 ✓

	15.0		
350.3		262.1	
137.7	33.2 ✓	48.8	31.2 ✓
170.9	30.1 ✓	80.0	33.4 ✓
320.2	63.3 ✓	228.7	64.6 ✓

	20.0		
359.7		87.3	
130.0	48.5 ~~3~~ ✓	223.5	42.9 ~~2~~ ✓
178.5	48.4 ✓	266.4	45.2 ✓
311.3	96.9 ✓	42.1	88.1 ✓

25.0

184.6		95.8	
305.9	56.6 ✓	214.8	59.2 ✓
2.5	56.1 ✓	274.0	58.0 ✓
128.5	112.7 ✓	37.8	117.2 ✓

30.0

		100.0	
189.5		209.4	70.6 ✓
298.0	71.5 ✓	280.0	71.1 ✓
10.5	68.4 ✓	28.9	141.7
121.1	139.9		

35.0

196.9		289.0	
294.2	79.2 ✓	24.0	80.8 ✓
13.4	84.6 ✓	104.8	82.0 ✓
112.3	163.8 ✓	207.0	162.8 ✓

40.0

201.3			297.0		
286.0	95.7 ✓	$8\overset{4}{\cancel{6}}.5$	19.3	86.8	82.5
21.7	93.5 ✓	86.3	106.3	98.4	92.3
108.0	189.2 ✓	170.8	198.6	185.2	174.8
	170.8 ✓			174.8 ✓	

45.0

210.6			300.4		
281.9	$1\overset{0}{\cancel{1}}8.6$	71.3	10.5	105.1	70.1
30.5	111.6	68.5	115.6	105.7	79.1
99.0	220.2	139.8	194.7	210.8	149.2
	139.8 ✓			149.2 ✓	

	50.0				
216.4			305.8		
276.0	119.4	59.6	5.2	120.6	59.4
35.4	121.9	59.1	125.8	123.0	57.0
94.5	241.3	118.7	182.8	243.6	116.4
	11~~7~~.7 8			116.4	
	55.0				
219.0			134.0		
270.6	131.1	51.6	180.0	126.8	49.0
41.7	130.3	47.0	306.8	130.0	54.2
88.7	261.4	98.6	01.0	256.8	103.2
	~~107~~.6 98			103.2	

Monday Nov 3 1902

Reduction of measures ff 75 – 88.

55.0
+ 2.83 ✓
+ 2.65 ✓
+ 1.~~47~~ 69 ✓
+ 1.58 ✓
4) 8.~~88~~ 75
2.1~~8~~ 9 ✓

50.0
+ 2.31 ✓
+ 2.41 ✓
+ 1.2~~4~~ 2 ✓
+ 1.27 ✓
4) 7.2~~3~~ 1
1.8~~1~~ 0 ✓
3.5
5.31

45.0
1.81 ✓
1.81 ✓
0.78 ✓
0.59 ✓
4) 4.99
1.25 ✓
3.5
4.75

40.0
+ 1.19 ✓
+ 1.16 ✓
+ 0.17 ✓
+ 0.10 ✓
4) 2.62
0.66 ✓
3.5

35.0
+ 0.74 ✓
+ 0.76 ✓ 150 ✓
− 0.31 ✓ 64
− 0.3~~2~~ 3 ✓
4) + 86
+0.22 ✓

30.0
+ 0.13 ✓
~~0.36~~ ~~0.52~~
+ 0.16 ✓
~~0.37~~ ~~0.16~~
−0.78 ✓ 29 152
−0.74 ✓
4) − 123
−0.31 ✓

25.0
− 0.10 ✓
− 0.07 ✓
− 1.36 ✓
−1.25 ✓
4) 2.78
−0.70 ✓

20.0
−0.90 ✓
−0.82 ✓
−1.73 ✓
−1.96 ✓
4) 5.41
−1.35 ✓

15.0
−1.62 ✓
−1.67 ✓
−2.74 ✓
−2.69 ✓
4) 8.72
−2.18 ✓

10.0
−2.36 ✓
−2.20 ✓
−3.28 ✓
−3.33 ✓
~~−2.74~~
4) 11.17
− 2.79 ✓

5.0
− 2.5~~9~~ 5 ✓
− 2.58 ✓
− 3.67 ✓
− 3.44 ✓
~~3.33~~ 4
4) 12.2~~8~~ 4
− 3.0~~7~~ 6 ✓

Tuesday Nov 18, 1902

Reduction of ratios to magnitudes for reducing measures of a G621TC.

	log	mag.
1	—	
2	0.30103	0.75
6	0.77815	1.94
16	1.20412	3.01
40	1.60206	4.00
100		5.00
251		6.00
631		7.00

Tuesday Dec. 2, 1902.

Rough Reduction of Means of α Orionis. Taken from Book of Out-of-Focus Plates of 11 inch Draper Telescope.

C 12960 (page 20)	Focus	Mean	Red
α Orionis	18.0	2.53	0.53
Polaris (mean)	10.0	3.30	1.70
			1.17

1.53
1.17
2.70 Brighter than Polaris.

C 13581 (page 32)

	Focus	Mean	Red.
α Orionis	14.5	3.74	3.18
Polaris (mean)	10.0	3.41	2.65
			.53

0.99
.53
0.46 Brighter than Polaris.

C 13658 (page 44)	Focus	Mean	Red.
α Orionis	14.0	3.57	3.02
Polaris (mean)	10.0	3.05	2.28
		~~1~~.52	0.74
		28	
		.80	

0.85 (by chart)
0.80
0.05 Brighter than Polaris

~~Tuesday~~ Wednesday Dec ~~2~~ 3 1902.

C 13708 (page 58)

				Red,
α Orionis	(1)	14.5	3.42	2.75
" "	(2)	10.0	2.98	1.87
		0.47		0.88
Polaris	(3)	10.0	3.09	2.08
"	(4)	12.0	3.46	2.82
		0.50		0.74

~~(1)+~~(2) & (3) gives 0.21 brig~~hter than~~ Polaris.

C 13760 & 64

			Red
α Orionis	14.5	3.79	2.42
α Urs Min (mean)	10.5	3.23	1.58
			.84

0.97
0.84
0.15 Brighter than Polaris

Friday: Dec 12 1902

Measured apertures of Stand. Argand. ~~or Portable Argand.~~ Brass Strip.

Using D6553 for scale

	mm			
9	7.3	7.00	~~2.93~~	
8	5.8	6.52	~~3.~~	.48
7	4.6	6.00		.52
6	3.7	5.50		.50
5	2.9+	5.02		.48
4	2.2+	4.48		.54
3	1.8−	3.99		.49
2	1.4	3.49		.50
1	1.1	2.93		.56

Measures of Disk A

	mm				
7	8.0	8.0	0.9031	1.4344	7.20
5	5.15	5.2	0.7160	1.2523	6.26
4	4.0	4.0	0.6021	1.1384	5.69
3	3.3	3.3	0.5185	10.548	5.27
2	2.55	2.6	0.4150	0.9513	4.76 ~~0.48~~
1A	1.9	1.9	0.2788	0.8151	4.08 ~~0.41~~
1	1.2	1.2	0.0792	0.6155	3.08 ~~0.3~~

	Diff.
7−5	.94
5−4	.57
4−3	42
3−2	.51
2−1A	.68
1A−1	1.00

Friday, Dec 12. 1902

Reduction of ratios to magnitudes.

1		mag.
2		0.75
4	0.60206	1.50
6		1.94
10	1.0	2.50
16		3.01
26	1.4149	3.54
40		4.00
64	1.80618	4.52
100		5.00
158	2.19866	5.50
250	2.3979	6.00

Saturday Dec 13 1902

Correction for positions 0.0 & 2.0 in dark room shown by A G. 682 Light = -3.0 mag.

~~Exp.~~ ~~Position 0.0~~ ~~E~~ ~~Position 2.0~~

Exposure ~~Light~~

~~Exp. Light Exp.~~

	Position		
Exp.	0.0	2.0	Diff
40^s	2.35	2.19	.16 $^{-1}$
26	2.80	2.53	.27 $^{+10}$
16	3.19	3.03	.16 $^{-1}$
10	3.57	—	—
6	4.01	3.83	.18 $^{+1}$
4	4.16	4.09	.07 $^{-10}$
			5).84
			0.17

Diff = 0.17

Sunday Dec 21 1902

Measuring C 7210
Similar app. ~~to those~~ used for Horiz Tel. bridge &c,
10in Ref.

Left aperture

21.4		291.9	
32.0	10.6	302.0	10.1
201.5	11.1	111.6	10.9
212.5	21.7	122.5	21.0

Right aperture

197.2		108.3	
214.0	16.2	125.0	16.7
18.8	16.6	289.0	16.6
35.4	32.8	305.6	33.3

5.11
5.18
4.21
4.17
4 | 18.67 |
4.67

6 min exp.
Right ap.

97.7 8
136.0 39 49 41
277.0 40 188 36
317 79 224 77

Left aperture

2.21
2.28
3.23
3.14
4)10.86
2.72

284 194
311 27 219 25
105 24 13 28
129 51 41 53

Left. 4 min exp

6, 277
48 42 316 39
188 33 96 41
221 75 137 80

2.35
2.19
1.08
1.56
4)7.18
1.80

Right.
177 90
238 61 143 53
354 64 271 51
58 125 322 104

Eq of 3m,
[illegible]

85		357	
150	65	62	68
261	67	173	66
328	132	239	134

Infr

				0.94
				0.90
				1.76
94		0		1.76
141	47	51	51	4) 5.36
223	49	186	45	1.34
322	96	231	96	

Monday Dec 22 1902

Measuring of prism of Σ 7214
Same apparatus as before.

5.0 (Standard) Left.

292.2		201.0	
302.2	10.0	212.5	11.5
111.8	10.4	20.4	12.1
122.2	20.4	32.5	23.6

5.0 Right

22.8		111.9	
31.5	8.7	122.2	10.3
201.8	9.1	291.5	9.9
210.9	17.8	301.4	20.2

5.25
4.93
5.54
5.27
4 | 20.99
5.25

3.75 (Intensity) Right

18		106	
36	18	126	20
198	18	288	18
216	36	306	38

3.75 Left

288		197	
307	19	216	19
107	19	17	19
126	38	36	38

4.00
3.88
3.88
3.88
4 | 15.64
3.91

2.5. Left

278		188	
317	39	225	37
99	34	9	37
133	73	44	74

2.41
2.38
2.75
2.90
4|10.44
2.61

2.5 Right

102		13	
132	30	42	29
279	33	192	30
312	63	222	59

1.25 Left

269		177	
32	58	240	63
84	64	352	67
148	122	59	130

1.25 Right

90		0	
145	55	55	55
270	52	182	51
322	107	233	106

1.15
.98
1.49
1.51
4|5.13
1.28

Tuesday, Feb. 3, 1903

Scale of S. A. Cooke Lens.
From AM 1428,

Stars marked by Mrs Fleming. Positions recorded as read by Professor Pickering.

Stars measured with border only, in line of dec.
~~from S to N.~~

Star	R. A.		Dec.		Dist in m.m from ~~Center.~~ North Edge of darkened film.
1	18	01.1	−45°	47′	220.5
2	18	01.8	−28	28	116.5
3	18	01.2	−21	27	75.0
4	18	02.1	−17	10	49.0

~~Center~~

Further edge 2/247.0

Center. 123.5

Dist from Cent (−30° −) ~~minutes of arc~~ D =		Dist in ~~m.m~~ cm
1	15° 47′	9,7.0
2	1 32′	,7.0
3	8 33	4,8.5
4	12 50	7,4.5

	1	2	3	4
Log Dist.	0.98677	9.84510	0.68574	0.87216
l t D	9.45126	8.42762	9.17708	9.35757
	1.53551	1.41748	1.50866	1.51459
	0.43803	8.27292	9.86282	0.22993

3/1.928

Mean of 1.384 = 33.09 cm

f =	
1	34.32
2	(26.15)
3	32.26
4	32.70
	4/ 543

(Mean = 31.36)

Tuesday Feb 3 1907

Scaling of S. a Cooke Lens.

by calc' 3.53627

Focus = 33.09 cm. by = 1.51970

2.01657

~~59~~ 53

33. | 57.3 (1.736

33

243

231

120

99

210

198

60

104160

1cm = 103'.9

60 ÷ | 103.9

| 1.73 times enl

to make scale 10mm = 1°

Least Square Solution.

α

$y \tan 15^\circ 47' - x = 9.70$

$y \tan 1\ 32 + x = .70$

$y \tan 8\ 33 + x = 4.85$

$y \tan 12\ 50 + x = 7.45$

tan α ~~9.45126~~

0.98677	9.84510	0.68574	0.87216
9.45126	8.42762	9.17708	9.35757
8.90252	6.85524	8.35416	8.71514
0.43803	8.27272	9.86282	0.22973

(-1 (+1 (-1

$0.2827\,y - x = 9.70$

$0.0268\,y + x = .70$

$0.1503\,y + x = 4.85$

$0.2278\,y + x = 7.45$

.4049 13.00

2827 9.70

$0.1222\,y + 4x = 3.30$

$0.03055\,y + x = 0.825$

$+0.0799 \quad \# \quad - \quad = +2.742$

$+0.0007 \quad + \quad + \quad = +0.019$

$+0.0226 \quad + \quad + \quad = +0.729$

$+0.0519 \quad + \quad = +1.697$

$+0.1551\,y + 0.1222\,x = +5.187$

Thursday Feb 5 1903

Solution by Least Squares

~~Jn~~ $\overset{y}{\cancel{F}}\tan\alpha - x = m$

$+ \quad + = +$
$+ \quad - = +$

Eq. $+0.2827\,y + x = +9.70$
$-0.0268\,y + x = -0.70$
$-0.1503\,y + x = -4.85$
$-0.2278\,y + x = -7.45$

$-0.4049\,y + \overset{4}{\cancel{2}}\,x = -13.00$
$0.6876\,y - 4\,x = 22.70$
$0.1219\,y - x = 5.675$

$0.0799 \quad + \quad — — = 2.742$
$0.0007 \quad - \quad — — = 0.019$
$0.0226 \quad - \quad — — = 0.729$
$0.0519 \quad - \quad — — = 1.697$

$0.1551\,y - 0.6876\,x = 5.187$
$0.1182\,y - — — — = 3.902$
$0.0369\,y = 1.285$

~~0.1719~~
9.23528 −
9.83734
9.07262

0.75397
9.83734
0.59131

0.10890
8.56703
1.54187
9.23528
0.77715

$y = F = 34.82$ c.m.

5.986
5.675
x = 0.311

Thursday Feb. 5, 1903

$-0.4049y + 4x = -13.00$
$+0.1557y - 0.4049x = +5.187$

$-0.1012\tfrac{1}{4}y + x = -3.25$

$$\begin{array}{r} 9.00529 \\ \underline{9.60785} \\ 8.61264 \end{array} \qquad \begin{array}{r} 0.57188 \\ \underline{9.60735} \\ 0.11923 \end{array}$$

$-0.0410y + 0.4049x = -1.316$
$\underline{+0.1557y - 0.4049x = +5.185}$
$+0.1141y = +3.869$

$$\begin{array}{r} 0.58760 \\ \underline{9.05729} \\ 1.53031 \end{array} \qquad y = z = \overset{\text{cm}}{33.91}$$

$$\begin{array}{r} 9.00529 \\ \underline{1.53031} \\ 0.53560 \end{array}$$

$$\begin{array}{r} 3.43 \\ \underline{3.25} \end{array}$$

$x = \overset{\text{cm}}{0.18}$

9.70	.70	4.85	7.45
.20	20	.20	:20
9.50	.90	5.05	7.65
0.97772	9.95424	0.70329	0.88366
9.45126	8.42762	9.17708	9.35757
1.52646	1.52662	1.52621	$1.5\overset{2}{\cancel{7}}609$
33.61	33.62	33.59	33.58

13.12
2.54
5248
6560
2624
33.3248

9.70	.70	4.85	7.45
.20	20	.20	:20
9.50	.90	5.05	7.65
0.97772	9.95424	0.70329	0.88366
9.45126	8.42762	9.17708	9.35757
1.52646	1.52662	1.52621	$1.5\overset{2}{\cancel{3}}609$
33.61	33.62	33.59	33.58

13.12
2.54
5248
6560
2624
33.3248

Thursday Feb 5, 1903

9.45126	8.42762	9.17708	9.35757
1.53031	1.53031	1.53031	1.53031
0.98157	9.95793	0.70739	0.88788
9.58	0.91	5.10	7.72
9.70	0.70	4.8~~0~~5	7.45
− .12	+ .21	+ .25	+ .27
~~− .18~~	~~+ .18~~	~~+ .18~~	~~+ .18~~
−30			
~~+ .06~~	~~+ .03~~	~~+ .07~~	~~+ .09~~

12.35	12.53	12.53	12.53
.18	.91	5.10	7.72
12.53			
9.58			
22.11	11.62	7.43	4.81
22.05	11.65	7.50	4.90
− .06	+ .03	+ .07	+ .09

Thursday Feb. 12, 1903

Focus of S.A. Cooke Lens. A.M 1124.

Stars \ Measures from South Edge of darkening of plates. Computed on basis f = 33.59 cm

	Stars	Dec		Diff.		c.m	cm	c.m		
A.G.C 5768	1	−31°	55'	17	55	1.80	10.86	12.66	0	+1
A.G.C 5817	2	−26	17	12	17	5.32	7.32	12.64	−2	−1
Dm −22° 1000	3	−~~17~~ 22	~~27~~ 32	8	32	7.61	5.04	12.65	−1	0
−17°.1028	4	−17	27	3	27	10.62	2.02	12.64	−2	−1
−13°.1063	5	−13	17	0	43	13.06	0.42	12.6~~8~~ 4	−2	−1
−8.1035	6	−8	48	5	12	15.70	3.06	12.64	−2	−1
−4°1044	7	−4	49	9	11	18.10	5.43	12.67	+1	+2
+3°785	8	+3	05	~~16~~ 17	~~55~~ 05	23.04	~~6.44~~ 10.32	12.72	+6	+1
						22 48		~~12.46~~ 1266 mean 12.66		1265

Later measure farther Star in circle enclosing two stars. The previous measure was of the brighter star.

Center (as marked) is 0.45 cm South of Star 5.

Dec = −13 17 + (10' × 4.5) = 45' = −14° 02'   Call Center −14° 0~~2~~ 0'

1	2	3	4	5	6	7	8
9.5097	9.3379	9.1762	8.7802	8.0972	8.9591	9.2086	9.4875 ~~9.2853~~
1.5262	1.5262	1.5262	1.5262	1.5262	1.5262	1.5262	1.5262
1.0359	0.8641	0.7024	0.3064	9.6234	0.4853	0.7348	~~0.8115~~ 1.0137

23.20
5.51
17.72
5.32
23.04

Friday Feb. 13, 1903.

Focus of S. A. Cooke Lens.
Position Corrected

		Diff		6	66	
1	−31 55	+17 55	1.80	10.87	12.67	+2
2	−26 17	+12 17	5.32	7.83	12.65	0
3	−22 30	8 30	7.61	5.03	12.64	−1
4	−17 26	3 26	10.62	2.02	12.64	−1
5	−13 15	0 45	13.06	0.44	12.62	−3
6	−8 46	5 14	15.70	3.08	12.62	−3
7	−4 47	9 13	18.10	5.46	12.64	−1
8	+3 06	17 06	23.04	10.35^{4}	12.69	+4
					~~8~~37	
					5	

tan 17 55 = 0.3233
tan 17 06 0.3076
0.6309) 21.240 (33.66
18927
23130
18927
42030
37854
4176

tan 12 17 0.2177
tan 9 03 0.1623
.3800
.38) 12.78 (3363
114
138
114
240
228
120

1	2	3	4	5	6	7	8
9.5096	9.3379	9.17450	8.7781	8.1170	8.9619	9.2102	9.4880
1.0367	0.8650	0.7016 ~~2721~~	0.3052	9.6441	0.4890	0.7373	1.0151
59	42	08	44	33	82	65	43

Friday Feb ~~7~~ 13, 1903

Focus of the Cooke Lens
accepted at $33\overset{c.m}{.}6$

By minimum Def. $3.536\overset{3}{\cancel{2}}$ 3.5363
1.5263 1.5276
2.0100 = ·102'.3 2.0087

- 7 $102'.\overset{0}{\cancel{1}}$

+0" 1 = 6

$6.0 \,/\, 102'.3$
1.70 times.

$33.6 \,/\, 57^{\circ}.3$

~~33~~
$33.6 \,|\, 3437.74$ ~~3(1,02'.3~~ 0

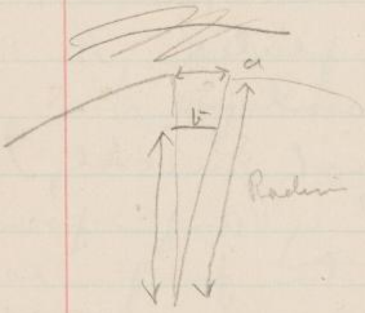
Enl. plates 1.70 times.

Tuesday Feb 17, 1903.

Set up Stereo-Comparator and examined I 29990 and I 29991 which were taken for Ceres. The interval was something over an hour between the two plates. The exposures were 12^{m} an 15^{m} respectively.
Did not find the asteroid quickly. I took plates from apparatus and by superposing and noting position angles in the proper region, I easily found it. Having marked the point, I returned the plates to the apparatus, but could not see the projection of the asteroid with sufficient certainty for picking it up, if it were unknown.
The method of superposition for this object appeared to me much more sensitive than that of stereoscopic vision.
On the other hand, images or rather defects that were on one plate and not on the other were very plainly distinguishable. I should think that it would be excellent for discovering new objects or variables.
An examination of AC 3220 & 3234 for Ceres taken 5 days apart, showed nothing

Wednesday April 1 1903

Measures of Opening of Revolving Sector used for measuring shades of Hr. Tel.



a = 9.5 m.m

rad = 152. m.m

b = ~~6~~7.0 m.m

Rad = 114 m.m

by tan.	0.9777 2.1818 8.7959	~~0.9031~~ ~~2.0569~~ ~~8.8462~~	0.8451 2.0569 8.7882
	3° 34'.6	~~4° 01'~~	3° 30'.8

Mean. 3° 32.7

60
180
32.7
212.7

360
60
21600'

4.3345
2.3278
4 | 2.0067
5.02

Wednesday April 1 1903

Another measure

8.7
0.6
8.1

Rad 13.1 cm

0.9085
2.1173
8.7912

3° 32'.3

Rad = 152	Rad = 131	Rad = 114
180	180	180.
34.6	32.3	30.8
214.6	212.3	210.8
4.3345	4.3345	4.3345
2.3316	2.3270	2.3239
4) 2.0029	4) 2.0075	4) 2.0106
~~5.01~~	~~5.02~~	~~5.0~~
5.007	5.019	5.026
5.01	5.02	5.03

~~Calling~~
More rigorously.

8.7912
0.3010
8.4902

1° 46'.25
2
3 32.5

Wednesday April 1 1902

Re Computation

1° 47'.4"
2
3 34.9

214.9
4.33445
2.33224
2.10221

~~R~~Chief	9.5	8.1	7.0
	2) 152	131	114.
	~~76.~~	~~65.5~~	~~57.~~
	4.75	4.05	3.5
	0.~~97772~~	~~0.90849~~	~~0.84570~~
	~~1.88081~~	~~1.81624~~	~~1.75387~~
	0~~.09691~~		
	0.67669	0.60746	0.54407
	2.18184	2.11727	2.05690
	8.49485	8.49019	8.48717
	1° 47'.4	1° 46'.~~06~~ 25	1° 45'.~~56~~ 51
	2	2	2
	3 34.8	3 32.~~1~~ 5	~~3 31.1~~ 3° 31.02
	214.8	212.5	211.02
	4.33445	4.33445	4.33445
	2.33203	2.32736	2.324~~28~~ 32
	4) 2.00242	4) 2.00709	4) 2.0101~~7~~ 3
	5.006	5.018	~~5.054~~ 5.0254
Result	5.01 mag.	5.02 mag.	~~5.2~~ 5.03 Mag.

~~Pat~~

Wednesday April 1 1902.

Computation repeated
using arc instead of tangent

0.97772	0.90849	0.84510
2.18184	2.11727	2.05680
8.79588	8.79122	8.78820
3.53627	3.53627	3.53627
2.33215	2.32749	2.32447
4.33445	4.33445	4.33445
2.00230	2.00696	2.00998
5.006	5.017	5.025

Monday April 6, 1903.

Measures of Shade Glass for Portable Argand made with app used for measuring Gradus Shading of Hor Tel

C Left

Index ap			Index disap		
354.0 ~~83.~~			83.3		
20.9	26.9	[illegible]	111.4	28.1	
173.3	27.7		263.6	27.3	
201.0	54.6		290.9	55.4	3.07
					3.04
					3.02

C Right

				3.09
83.3		353.8		4 | 22
111.0	27.7	20.7	26.9	3.06
263.3	28.1	173.3	27.3	
291.4	55.8	200.6	54.2	

Monday April 6, 1903

d Right

Index up		Index down		
263.5		353.5		
290.7	27.2	20.9	27.4	
83.5	27.8	173.8	26.8	3.06
111.3	55.0	200.6	54.2	3.09
				3.13
				3.08
				4).36
				3.09

d Left

173.7		262.7	
200.2	26.5	290.0	27.3
354.1	26.7	83.1	27.1
20.8	53.2	111.2	54.4

Tuesday April 8, 1903

Measures of Large opening of Sector

a = 99.4 m.m ~~49.7~~ 47.8
r 152.5 ~~cm~~ m.m
Remeasured at 94.5 accepted.

a = 71.0 m.m 35.5
r 1150 m.m

19.80
11.45
a = 8.35 mm 41.8
~~113.4~~
r. 134.0 m.m

	1.67943 ~~1.69636~~	1.62118	1.55023
	2.18327	2.12710	2.06070
Sin	~~9.51309~~ 9.49616	9.49408	9.48953
360 40 21600	18° 16'.0 ~~19~~ ~~1.2~~	18° 10'.6	17° 58'.8 2
3 60' 2160 32.0 2.	36° 32.0 ~~38~~ ~~2.4~~	36 21.2	35 57.6
	2192.0	2181.2	2157.6
2160. 2.4 2157.6	4.33445 3.34084 ~~4.33445~~	4.33445 3.33870	4.33445 3.33397
3560 2160	4) 0.99361	4) 0.9967.5	4) 1.00048
	2.484	2.492	2.501

Saturday May 2, 1903.

Diff in Distance corresponding to 5.0 & 4.9 mag, the distance for 5.0 mag being 100 c.m.

5
.4
2.0

4.9
.4
2)1.96
0.98

100. :

10 : 9.55 :: 100 : 95.5 cm.

10. 9.55

2.0
2
4.0

1.98
2
3.96

0.98
2
.4)1.96
.49

4.92
4
2)1.968
.984

Dist 96.4 c.m

mag	Dist
4.90	95.5
4.92	96.4
4.94	97.3
4.96	98.2
4.98	99.1
5.00	100.0

Tuesday. May 26 1903

Magnitude of Stand. Argand.

From Book of Wedge Measures it is taken ~~that~~ the absorption of 11" is 0.5 mag.

Sq aperture = 19.3 c.m

Sq. at focus 10. = .36
of out-of-focus ap.

Sq at focus 12. = .46

by

1, 28556
9, 55630
1.72926
2
.4 / 3,45852
8.64 mag
~~8.~~

1.28556
9.66276
1.62280
2
4 / 3.24560
8.11

8.64
8.11
53

Therefore 11-inch at focus 10. gives light 8.64 − .5 = 8.1 brighter

Image at 10 is = to Argand 4d = −(4.5 − 3.1) = −1.4

i.e. Polaris ~~2.5 − 8.1 = − 5.6 = −1.4 (std)~~.

~~i.e.~~

Polaris = −1.4 + 8.1 = + 6.7 of Stand Lamp.

Tuesday May 26 1903

From examination of AG 810 estimates from wedge α Bootis to be 1.0 magnitude fainter than sq of light +3.0 of Stand. light. This makes α Bootis = +4.0 of Stand light. Diff of α Bootis & Polaris from Harvard Phot. 2.5
∴ Polaris = 6.5 of Stand Lamp.

a Star of 0 mag would = +4.0 of std lamp.

Moon at Full is about equal ~~as the~~
−7.0 ~~−3.0~~ Sun is about 14.5 mag. brighter.

i.e. Full Moon is about − ~~7.0~~ 11.0 &
Sun ———— ~~21.5~~
−25.5

Tuesday June 2, 1903.

mag.	Ratios	log	log recip	Recip.	
0.	~~1.6~~ 1.0	0.0	0.0	1.00	1.000
0.5	~~2.~~ 1.6	0.2	9.8	.63	.631
1.0	2.5	0.4	9.6	.40	.398
1.5	4.0	0.6	9.4	.25	.251
2.0	6.3	0.8	9.2	.16	.158
2.5	10.0	1.0	9.0	.10	.100
3.0	15.8	1.2	8.8	.06	.063
3.5	25.1	1.4	8.6	.04	.040
4.0	39.8	1.6	8.4	.025	.025
4.5	63.1	1.8	8.2	.016	.016
5.0	100.0	2.0	8.0	~~.004~~ .010	.010

Let A & B be two lights differing by 0.5 mag..

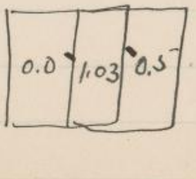
If B is the brighter light it is 1.585 as bright as A.

The combined light of A & B is 2.585 times that of A 2.585

log 2.585 = 41 0.41246

1.03

Therefore if 2 squares differing by 0.5 mag. are superposed, we shall have



Wednesday June 24, 1903

Measured front aperture of Plat. E: which should cover~~s~~ an area about 10° in diameter.

Diam of aperture $17^{cm}.45$ log 1.24180

Dist from Plate to Porcelain 100.20 cm.

0.30103

0.94077

log 2.00087

8.93990

Tan angle. .93903

~~Sin~~ 87

8.93740

Sin = 87

8.93827

sin 30″ 6.16270

2.77557

2

4) 5.55114

13.88

~~8~~ 4° 58.6

2

9 ~~59.2~~

57.2

Therefore this aperture on Plate E should be rated at 13.88 magnitudes on the standard scale.

~~Sin 9 57.2~~

Sin 4 58.6

Saturday June 26, 1903

Examination of AG 976 comparing lights of Sun & Polaris.

Pinhole diff. of 9&1 "Shaded"

Pinhole Camera cuts of 14.3 + 4.0 + 3.1 = 21.4
14.3 + 3.5 + 3.1 = 20.9

Focus 12.0 of 11-in Draper is between ap 1 & 2 say 3/5 to 2
∴ = ~~21.2~~ = 21.1

From page 110

Focus 12.0 increases brightness by 8.1 mag.
Ab. .6
7.5
21.2
28.7
Diff Polaris & 1st Mag including Sun. 2.2
Polaris ~~7~~ ~~2.5~~
26.5

8.03
$.8\overset{0}{8}$
7.23
21.1
28.33
2.15
26.18
26.2

12.0 of Polaris is nearly as faint as 22.0 of Arcturus
i.e. diff = 1.5 mag.

Saturday June 26 1909

amount of light which added to a star of − 25.5 mag. will make the that light −26.5

−25.5
.4
~~102.0~~
10.20

−26.5
.4
10.60

11 place

3981
1585
2396 ″

4
,4) 10.~~37~~9
−2.6

F

Tuesday June 30, 1903.

Threw up apertures of Portable Argand by means of Ross-Zeiss lens with an enlargement of about 20 or more times.
Measured diameters with millimeter rule.

			Mean c.m
9	$\overset{2}{\cancel{3}}4.30$	$\overset{2}{\cancel{8}}4.30$	24.30
8	19.50	19.50	19.50
7	15.30	15.30	15.30
6	12.20	12.20	12.20
5	9.75	9.75	9:75
4	7.50	7.50	7.50
3	$\overset{5}{\cancel{6}}.95$	$\overset{6}{\cancel{7}}.00$	$\overset{5}{\cancel{6}}.98$
2	4.65	4.70	4.68
1	3.60	3.60	3.60

Mean of both visual & phot. Means log

9	24.28	1.38525	0.8639	1.4002	7.00	00
8	19.46	1.28914	0.7678	1.3041	6.52	−2
7	15.25	1.18327	0.6629	1.1992	5.95	+5
6	12.17	1.08529	0.5639 ~~6396~~	1.1002	5.50	0
5	9.72	0.98767	0.4663	1.0026	5.01	−1
4	7.48	0.87390	0.3526	0.8889	4.44	+6
3	5.96	0.77525	0.2539	0.7902	3.95	+5
2	4.66	0.66839	$0.14\overset{79}{\cancel{06}}$	0.6833	3.42	+8
1	3.59	0.55509	0.0337	0.5700	2.85	+15
					m	+4

Tuesday June 30 1903

Measures of diameter of aperture of Portable Argand from Photographs taken yesterday. Measures made with m.m. rule.

							Mean cm
9	2$\overset{4}{\cancel{5}}$.2	2$\overset{4}{\cancel{5}}$.3	2$\overset{4}{\cancel{5}}$.25	2$\overset{4}{\cancel{5}}$.25	2$\overset{4}{\cancel{5}}$.3	2$\overset{4}{\cancel{5}}$.3	2$\overset{4}{\cancel{5}}$.27
8	19.45	19.4	19.4				19.42
7	15.2	15.2					15.20
6	12.15	12.12					12.14
5	9.70	$\overset{9}{\cancel{10}}$.65					9.68
4	7.45	7.45					7.45
3	5.95	5.95					5.95
2	4.65	4.65					4.65
1	3.60	3.58	3.55	36.0			3.58

	Size	Old	Diffs	Microsc'	C.Sm 17 f 19.6	Mean.
−4	7.31	7.31	0		7.32	7.31
−6	5.86	5.87	−1		5.87	5.87
+1	4.60	4.60	0		4.64	4.61
−4	3.66	3.66	0	3.67	3.70	3.67
−5	2.93	2.93	0	2.93	2.94	2.93
+2	2.25	2.29	−4	2.26	2.26	2.26
+1	1.79	1.83	−4	1.79	1.82	1.81
+4	1.40	1.45	−5	1.4$\overset{2}{\cancel{1}}$	1.42	1.42
+11	1.08	1.12	−4	1.10	1.10	1.10

Tuesday June 30 1903

Measures of Apertures of Portable Aug[illegible]
by Microscope.

Measures of intervals of 1mm each determined by one of Prof. Rogers scales

		Mean	
3.25	35	3.30	
14.48	55	14.52	11.22
25.66	69	25.68	11.16
36.82	.86	36.84	11.16
			354
			11.18 = 1mm

Again

3.31	
14.53	11.22
25.76	11.23
36.92	11.16
	3161
	11.20 = 1mm

apertures.

ap. ~~1~~ 2

16.63 62
32.48 49

Diff = 11.2) 1.5.86 (~~13~~ 1.416
112
466
448
180
112
680

ap 1 [illegible]

18.84 80 } mm 82
31.14 .12 } 13

Diff = 112) 12.31 (1099
112
1110
1002
1080

~~June~~ Tuesday June 30, 1903

			mean			
3	15.15	14	14	11.2	20.06 11 2 886 784 1020 1008 12	1.79
	35.21	.19	20			
4			mean			
	12.68	67	68	11.2	25.26 22 4 286 224 620 672 56	2.26
	37.96	91	94			
5	7.86	84	mean .85	11.2	32.84 224 1044 1008 360 336	2.93
	40.69	69	.69			
6	4.00	3.96	mean 3.98			
	45.05	45.09	45.07	11.2	41.09 33 6 749 672 770 784	3.67

Summary

From C.S.M. 17 p 195,6

accepted

9	~~1.10~~	f	7.32
8			5.87
7			4.64
6	3.67		3.70
5	2.93		2.94
4	2.26		2.26
3	1.79		1.82
2	1.42		1.42
1	1.10		1.10

Tuesday June 30, 1903.

Apertures of Portable Argand
Means of Measures page 117

		log			
9	7.31	0.8639	1.4002	7.00	0
8	5.87	.7686	$1.\overset{30}{\cancel{29}}49$	$6.\overset{52}{\cancel{47}}$	−2
7	4.61	.6637	1.2000	6.00	0
6	3.67	.5647	1.1010	5.50	0
5	2.93	.4669	1.0032	5.02	−2
4	2.26	.3541	$\overset{0}{1}.8904$	$4.4\overset{5}{6}$	+4
3	1.81	.2577	$\overset{0}{1}.7940$	3.97	+3
2	1.42	.1523	$\overset{0}{1}.6886$	3.44	+6
1	1.10	.0414	$\overset{0}{1}.5777$	2.89	+11

log sin $\frac{\phi}{2}$ = 6.1627

Const = ~~9.6~~ 9.4637

				Rel.	Error.
9	7.32	0.8645	1.4008	7.00	0
8	5.87	.7686	1.3049	6.52	−2
7	4.60	.6628	1.1991	6.00	0
6	3.67	.5647	1.1010	5.50	0
5	2.93	.4669	1.0032	5.02	−2
4	2.26	.3541	0.8904	4.45	+5
3	1.81	.2577	0.7940	3.97	+3
2	1.42	.1523	0.6886	3.44	+6
1	1.10	.0414	$0.5\overset{7}{\cancel{8}}77$	2.89	+11

Wednesday July 8, 1903

Reduction of means of page 116 + 117

then 0.86392
1.38561
9.47831

	Visual	Log.	Accept 7.31 = 9	
9	24.30	1.38561	0.86392	7.
8	19.50	1.29003	0.76834	5.87
7	15.30	1.18469	0.66300	4.60
6	12.20	1.08636	0.56467	3.67
5	9.75	0.98900	0.46731	2.93
4	7.50	0.87506	0.35337	2.26
3	5.98	0.77670	0.25501	1.80
2	4.68	0.67025	0.14856	1.41
1	3.60	0.55630	0.03461	1.08

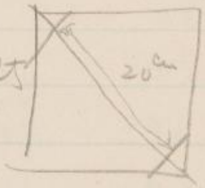
accept 7.31 0.86392
1.38507
9.47885

	Photographic			
9	24.27	1.38507	0.86392	—
8	19.42	1.28825	0.76710	5.85
7	15.20	1.18184	0.66069	4.58
6	12.14	1.08422	0.56307	3.66
5	9.68	0.98588	0.46473	2.92
4	7.45	0.87216	0.35101	2.24
3	5.95	0.77452	0.25337	1.79
2	4.65	0.66745	0.14630	1.40
1	3.58	0.55388	0.03273	1.08

Saturday Sept 19, 1903

Measures of Squares out of focus with 11 mich.

Some wires were stretched over the sq. aperture in regular use, thus



The distance marked is exactly 20 cm. & is measured on the plate by means of D 6553.

Foci	mm		
34	16.2	16.2	24
27	12.7	12.6	17
22	10.2	10.1	12
18	8.0	8.0	8
14.5	6.2	6.2	4.5
12	5.0	4.9	2.
10	3.9	3.9	0

$y = mx + c$

$16.2 = 24m + c$	$388.8 = 576m + 24c$
$12.7 = 17m + c$	$215.9 = 289m + 17c$
$10.2 = 12m + c$	$122.4 = 144m + 12c$
$8.0 = 8m + c$	$64.0 = 64m + 8c$
$6.2 = 4.5m + c$	$27.9 = 20.25m + 4.5c$
$5.0 = 2m + c$	$10.0 = 4.m + 2c$
$3.9 = 0m + c$	$0 = 0 \quad 0$
$62.2 = 67.5m + 7c$	$829.0 = 1097.25m + 67.5c$

$4198.50 = 4556.25m + 472.5c$

$5803.00 = 7680.75m + 472.5c$

$1604.50 = 3124.50m$

$m = 0.513 \qquad c = 3.9$

~~Mond~~ Tuesday Sept 22, 1903

Measures of C 14455 the same plate used on p 122 of this book. Original record to be found in C.S.m of date Sept 21, 1903.

Foci	1/24 inch	Same omitting last place	Res.	Expressed in mm	Computed from formula below	Res.
34	15.338	15.34	0	16.23	16.26	−3
27	11.988	11.99	+4	12.69	12.67	+2
22	9.584	9.58	+5	10.14	10.101	+4
18	7.598	7.60	+1	8.04	8.05	−1
14.5	5.910	5.91	+2	6.26	6.26	0
12.0	4.709	4.71	+3 ~~−5~~	4.98	4.98	0
10.0	3.710	3.71	0	3.93	3.95	−2
						.12

Diff. 1st & last

24) 11.63 (.4846
96
203
192
110
96
140

~~24) 12.63 (.502625~~
.52625
~~120~~
~~63~~
~~48~~
150
144
60
48
120
120

$144x + 12y = +73.08$
$25x + 5y = +12.75$
$0x + 0y = 0$
$16x - 4y = +8.40$
$56.25x - 7.5y = +29.10$
$100.00x - 10.y = +51.60$
$144.00x - 12.y = +74.52$
$485.25x - 16.5y = 249.45$
$-16.5x + 7y = ~~-17~~ -6.71$
$~~+3397.25x - (\ )y = +1746.15~~$
$~~+272.25x - (\ )y = +110.715~~$
$~~3125.00x = 1635.435~~$

10.10 ÷ .5128 = 19.69
22.0 − 19.69 = 2.31

$+12x + y = +6.09$
$+5x + y = +2.55$
$0 + y = 0$
$-4 = -2.10$
$-7.5 = -3.68$
$-10. = -5.16$
$-12 = -6.21$
$+17.0 \quad +8.64$
$-33.5 \quad -17.35$
$-16.5x + 7y = -8.71$ ~~−6.71~~

$3396.75x - (\ )y = 1746.15$
$272.25x - (\ )y = 143.715$
$3124.50x = 1602.435$

~~x = +0.52341~~

x = 0.5128
y = −0.036

~~y = +0.275 = +0.28~~

Wednesday Sept 23, 1903

Measure of relative size of images out of focus taken with 11-inch Draper Telescope

Foci	C14455 C.Sm 17 Sept 21	C14458 C.Sm 17 Sept 23	Mean	
34.0	15.338	15.304	15.321	
27.0	11.988	11.925 -1	11.956	+20
22.0	9.584	9.492 +22	9.546	+27
18.0	7.598	7.520 +14	7.559	+26
14.5	5.910	5.871 -24	5.896	+ 3
12.0	4.709	4.703 +14	4.706	+22
10.0	3.710	3.724	3.717	

24) 11.580 (.4825
96
198
192
60

24) 11.604 (.4835
96
200
192
84
72
120

		Mean
15.34	15.30	15.32
11.99	11.92	11.96
9.58	9.49	9.54
7.60	7.52	7.56
5.91	5.87	5.89
4.71	4.70	4.70
3.71	3.72	3.72

			Log	10-log	Mag.	Diff
mean	16.22 ÷ 200 =	.0811	8.9090	1.0910	5.46	3.03
	12.66	.0633	8.8014	1.1986	5.99	2.54
	10.09	.0504	8.7024	1.2976	6.49	2.04
	8.00	.0400	8.6021	1.3979	6.99	1.54
	6.24	.0312	8.4942	1.5058	7.53	1.00
	4.98	.0249	8.3962	1.6038	8.02	0.51
	3.94	.0197	8.2945	1.7055	8.53	000

Wednesday Sept 23, 1903

From preceding page

Values for
C8m 17 Sept 23. C 14458.

#	~~Rds~~ mm	~~F.~~	diff f value for 22		~~M~~	Computed for formula given value	Res.
34.	16.20	~~30x~~ ~~34x~~ +12	+ 6.16	=	73.92	16.18	+ 2
27	12.62	+5 x	+ 2.58.		12.90	12.60	+2
22	10.04	0 x	0.00		0.00	10.05	−1
18	7.96	−4x	− 2.08		8.32	8.01	− ~~3~~5
14.5	6.21	−7.5x	− 3.83		28.725	6.22	−1
12	4.98	−10x	− 5.06		50.60	4.94	+4
10	3.94	−12x	− 6.10		73.20	3.92	+ 2
			+ 8.74		247.665		17

Least sq solution. −17.07

− 8.33

$$-16.5x + 7y = -8.33$$
$$485.25x - 16.5y = +247.665$$

$$272.25x = (\ )y = 137.445$$
$$3396.75x * (\ )y = 1733.655$$

$$3124.5\ x = 1596.210$$

$$x = 0.5709$$

$$y = +\ 0.014$$

~~3~~.5109 / 10.050 (~~2.19~~ 22.00
~~218~~ 19.67
5109 ~~19.6~~
49410 2.33
45981 19.7
34290 22.0
306594 .2.3
~~36360~~

~~3~~ = magnitudes

~~5 = M = 0.5109 F + 10.05~~

Saturday
~~Wednesday~~ September 26, 1903

3rd Set of Measures of Relative Size of Images taken out-of-focus with the 11-inch Draper Telescope.
C. Stn No. 17. Current data.
C14465

+12	34.	15.299	16.19	+ 6.14	73.68	16.18	+1
+~~10~~5	27.	11.925	12.62	+2.57	12.85 ~~25.70~~	12.61	+1
0	22.	9.497	10.05	-0.00	0.00	10.06	-1
-~~2~~4	18	7.547	7.99	-2.06	8.24	8.02	-3
-7.5	14.5	5.906	6.25	-3.80	28.50	7.23	+2
-10	12.	4.702	4.98	-5.07	50.70	4.96	+2
-12	10	3.719	3.94	-6.11	73.32	3.94	0
				+ 8.71 -17.04	247.29		10

−16.5x + 7y = − 8.33   137.445
485.25x − 16.5y = + 247.29   1731.03

3124.5) 1593.585 (.5~~88~~
.5100
156225
313350
~~156225~~
~~9125~~
3124.5
~~0~~90~~3~~50

3124.5 x =

x = 0.5100

y = 0.01

Saturday, Sept. 1

Discussion of measures for pp 123, 124, 126.

Ser.	1st	2	3	Sum	Mean	Diff fr 22 point		Values computed from curve of 2nd order.	Residuals.
34.	+24 15.338	−10 15.304	−15 15.299	−1 41	15.314	+12 +5.790	69.480	6 15317 ~~15.285~~ 4	2 −3
27.	+42 11.988	−2~~x~~ 1 11.925	−2~~x~~ 1 11.925	0 138	6 11.94~~7~~	+5 +2.422	12.110	11.935 ~~11.917~~	12 ~~+11~~
22.	+60 9.584 3	−32 9.492	−27 9.497	+1 373	9.524	0 0.000	0.000	9.519 ~~9.513~~	+5
18.	+4~~8~~ 3 7.598	−35 7.520	−8 7.547	0 .165	7.555	−4 −1.9~~7~~9 6	7.876	7.586 ~~7.569~~	~~−81~~
14.5	+14 5.910	−25 5.871	+10 5.906	−1 2687	5.896	−7.5 −3.628	27.210	~~6.015~~ 5.895 ~~5.906~~	+1 ~~+19~~
12.	+4 4.709	−2 4.703	−3 4.702	−1 14	4.705	−10 −4.819	48.190	4.687 ~~4.704~~	+18
10.	−8 3.710	+6 3.724	+1 3.719	−1 23	3.718	−12 5.806	6~~8~~.672 9	3721 ~~3.742~~	−3
					+17.0 −33.5 −16.5	+ 8.212 −16.222 −8.016	23~~3~~.538 4		

$-16.5x + 7y = -8.010$

$+485.25x - 16.5y = +23\cancel{3}.538$ (4)

$3396.75x - (\ )y = 16\cancel{34}.766$ (41)

$272.25x - (\ )y = 13\cancel{2}.165$ (9)

$3124.5\cancel{0}x$

~~x = 0.4809~~

1509.601
~~502.601~~
~~562.25~~
~~035~~
~~0.5 0.480979~~
252801
249960
284100
281205
289500

x = 0.48315
y = −.005

3124.5) 1509.601 (0.4831~~8~~ 5
124980
259801
249960
98410
93735
46750
31241
~~255050~~
~~249960~~
~~5090~~
156221
−1175

.4809 × 16½
28854
4809
2404
+7.9348
−8.010
7) −.0752
−.0107

.4809 × 485¼
24045
38472
19236
1202
+233.3567
−233.538
16.5) .1813 (109
165
1630
5

y = −0.011

.48315 × 16½
289890
48315
24158
+7.97198
−8.010
7) −.03802
−.0054

.48315 × 485¼
241575
386520
193260
234.32775
12079
+234.44854
−234.538
16.5) .08946 (−.005 ~~5~~ 4
825
~~7~~96 6

3
6
18
14
4

Checked Oct 3 1903

checked Nov 21 1906

Saturday Sept 26, 1903

Values of ~~fo~~ Out-of-focus images of 11-meter Drager. . . ; checked Nov 21 1906

	Accepted values "1/24"	log	log of ratio.	Mag.	Diff
34	15.31~~7~~6	1.1851~~8~~7	1.0912~~3~~4	5.46	3.07
27	11.93~~6~~4	1.076~~82~~78	1.1996~~1~~3	~~5~~6.00	2.53
22	9.519	0.97859	1.29782	6.49	2.04
18	7.576	0.87944	1.39697	6.98	1.55
14.5	5.895	0.77048	1.50593	7.5~~2~~3	1.0~~2~~0
12	4.687	0.67089	1.60552	8.03	0.50
10	3.721	0.57066	1.76525	8.53	0.00

	Repeated	Diff
34	5.456	3.073 ~~3.027~~
27	5.998	2.531
22	6.489	2.040
18	6.985	~~2~~1.544
14.5	7.5~~25~~30	~~2~~1.004 0.999
12	8.028	0.501
10	8.529	0.000

25.4 1.40483
24. 1.38021
0.02462
200 2.30103
2.27641

.48315) 9.519000 (
.48315
4687 50
4~~38~~34 48 35
~~12~~3 39150
338205
9450

22.0
19.7
2.3 is true focus for this apparatus.

0.
0.9786
9.6841
1.2945

Saturday Oct. 3, 1903

[illegible] from page 127 omitting that cor-
[illegible] -4

page 127	Computed		Residual	
14	~~14.326~~	14.319	~~-6~~	-5
46	~~11.939~~	11.938	~~+7~~	+8
24	~~9.524~~	9.523	~~0~~	+1
57	~~7.592~~	7.591		(~~-37~~ -36)
6	~~5.902~~	5.900	~~-6~~	-4
5	~~4.694~~	4.693	~~+11~~	+12
6	~~3.728~~	3.727	~~-10~~	-9

~~8~~

~~1.766~~

1.70575

9.00
2
1.800

~~1.70575~~

2.276
1.800
0.476

~~2.27641~~
~~0.57066~~
1.70575

2.992

~~2.27641~~
~~1.09124~~
1.18517

9.524 − 0.48315 X −.005 = 2.992
5
9.521
2.992
6.529

.48315) 6.5290 (13.5
48315
169750
144945
248050
241575
64750

22.0
13.5
8.5

Focus for ½ mag brightness

2

.5115
972

605
00
605
400
050
775
27500
31850
−.04350

7) −.0030
−.0004

4341
2898
19321
1
226.648
226.662
−.0180 (.001
125
12.5

483016
.48302
y = −.000055
= −.0001

12½

483024
966 0
2415 1
6.0377 5
6.041
.00325
6/7) ~~.00046~~
.0005
0005

48302
469¼
4347 18
2898 12
193208
2265363 8
12076
226.657 2/4
226.66
12.5) .00486 (.0004

Saturday Oct. 3, 1903

Least Sq solution of values from page 127 omitting that corresponding to focus 18.0 or −4

		From page 127	Computed		Residual	
+12	———	15.314	~~15.320~~	14.319	~~−6~~	−5
+5	———	11.946	~~11.939~~	11.938	~~+7~~	+8
0	———	9.524	~~9.524~~	9.523	~~0~~	+1
		(7.555)	~~7.592~~	7.591		(~~−37~~ −36)
−7.5	———	5.896	~~5.902~~	5.900	~~−6~~	−4
−10	———	4.705	~~4.694~~	4.693	~~+11~~	+12
−12	———	3.718	~~3.728~~	3.727	~~−10~~	−9

$$-12.5x + 6y = -6.041$$
$$469.25x - 12.5y = 226.662$$

$$+156.25x - (\ ) = +75.5115$$
$$2815.50x - (\ ) = +135.9972$$

$$2659.25x = 1284.4605$$

1063700
2207605
2127400
80205
79777.5
427500
531850
−104350

.483016
.48302
$y = -.000055$
$= -.0001$

12½
483024
96604
24151
6.03775
6.041
.00325
~~.00046~~
.0005
6/7
.0005

.483
12½
966
483
242
6.038
6.041
−.0030
7) −.0004

.483
.469¼
4347
2898
1932
121
226.648
226.662
−.0180
12.5) −.0125
.001

.48302
469¼
4347 18
2898 12
19320 8
226.53638
12076
226.65714
226.662
12.5) .00486
.0004

Saturday Oct 3, 1903

Computation of Relative sizes of Images out of focus
Cally focus 2.3

34.0	27.0	22.0	18.0	14.5	12.0	10.0
2.3	2.3	2.3	2.3	2.3	2.3	2.3
31.7	24.7	19.7	15.7	12.2	9.7	7.7
1.5011	1.3927	1.2945	1.1959	1.0864	0.9868	0.8865
8865	8865	8865	8865	8865	8865	
0.6146	.5062	.4080	.3094	.1999	.1003	
3.07	2.53	2.04	1.55	~~2.00~~ ~~9.9~~ 1.00	0.50	

1.50106	~~4517~~	.29447	.19590	1.08636
0.88649	39270	88649	88649	88649
	88649			
2)1.61457	2)50621	2)40798	2)30941	2)19987
3.07	2.53	2.04	1.55	~~999~~ 1.00

0.616
8865
1.5025

~~6.0~~
4.5 mm
2
0.9000
.8865
1.7865
61.1

5.0
2
1.000
8864
1.8864
77 cm

7″
5

Computation for shorter foci.

131a

10.0	8.5	8.0	7.5	7.0	6.5	6.0
2.3	2.3	2.3	2.3	2.3	2.3	2.3
7.7	6.2	5.7	5.2	4.7	4.2	3.7
0.8865	0.8865 0.7924 2) 0.0941 − 0.47	0.8865 0.7559 2) .1306 − .65	0.8865 0.7160 2) 1705 − .85	0.8865 0.6721 2) .2144 − 1.07	0.8865 0.6232 2) 0.2633 1.316 − 1.32	0.8865 0.5682 2) .3183 − 1.59

Diff for 10.0

Checked Feb 1909

− 8.53
− 0.47
− 9.00

Check Feb 1909

− 8.53
− 1.07
− 9.60

Larger [illegible]	b	13.8	14.0	14.4	0.4	0.6
Small [illegible]	c	8.6	8.8	9.1	0.3	0.5
4	d	5.6	5.8	6.1	0.3	0.~~4~~ 6
5	e	3.5	3.8	4.1	0.3	0.6
6?	f	2.3	2.4	~~0.6~~ ~~6.5~~ 2.9	0.3 ~~2.2~~	0.6

6) 2.1

6) 3.2

+0.5
+0.6

.81) 0.3000 (0.37
243
570

Effect of diffraction reduces a.f. by 0.37 cm

81/6) ~~.21~~ 486) 2.100 (43
1944
1560

6) 2.1

81) .35 (0.43 cm.
324
260

That is, an allowance of 2 mm should be made on ~~each~~ at every edge of an aperture

Wednesday Nov. 11, 1903

Measures of apertures of 11-inch. C 34 p. 167

	A cm.	B / .81	Diff
Full	28.0	27.7	.3
Large Jup. Eel.	17.8	17.3	.5
Small " "	11.2	10.9	.3
4	7.55	7.16	.39
5	5.05	4.69	.36
6	2.55	2.96	.59
~~7~~	~~0.60~~	~~3.~~	6 | 2.44
			0.41. cm.
8	3.55 approx as it varies from 3.5 to 3.6		

~~Measures of diameter of images C 14565 taken out of focus~~

Measures of out-of-focus images on C 14565 made with a steel rule. I made at mean center of diffraction ring. II made at extreme edge of image.

~~C 8 inch a 5.75 + 5.3 = 22.1 22.3~~

~~Ev~~		I mm	II mm B	~~A×.81~~ = A×.81	Diff.	Diff. 1st Ring
Full	a	22.2	22.4	22.7	0.3	0.5
Large Jup.	b	13.4	14.0	14.4	0.4	0.6
Small Jup.	c	8.6	8.8	9.1	0.3	0.5
4	d	5.6	5.8	6.1	0.3	0.~~4~~6
5	e	3.5	3.8	4.1	0.3	0.6
6?	f	2.3	2.4	~~0.6~~ ~~6.5~~ 2.9	0.5 2.2	0.6

6 | 2.1

6 | 3.2

+0.5
+0.6

.81) 0.3000 (0.37
243
570

Effect of diffraction reduces ap. by 0.37 cm

81/6 | .21
486 | 2,100 (43
1944
1560

6 | 2.1
81 | .35 (0.43 cm.
324
260

That is, an allowance of 2 mm should be made on at every ~~att~~ edge of an aperture

Saturday Nov. 14, 1903

Jupiter Eclipse apertures (See previous page)

	Full		Large		Small	
	28.0		17.8		11.2	cm.
Cor. for diffrac.	.4		.4		.4	
	27.6		17.4		10.8	cm
2/	1.4409		1.2406		1.0334	
	7.20		6.20		5.17	
Diff. (Ratios of apertures)		1.00		1.03		

With no Correction for ~~refraction~~ diffraction.

	Full		Large		Small
2/	1.4472		1.2504		1.0492
	7.24		6.25		5.25
Diff. (Ratio of apertures)		0.99		1.00	

27.1/968
9/84

Monday Nov. ~~26~~ 23, 1903.

Measures of out-of-focus images on C 14574. Same, in general as C 14565 (see page 131) except focus was 18 instead of 34. ~~Mea~~

Measured with steel rule & pocket magnifyer

Image	Aperture	Diam. 1st Diff Ring. mm	Extreme edge	Diam 2d Ring	Diff 1st & 2nd	Theoretical value H.?	Diff 1st Ring
a	Full	10.7	11.0	10.3	0.4	11.2	0.5
b	Large	6.8	7.0	6.3	0.5	7.1	0.3
c	Small	4.1	4.4	3.7	0.4	4.5	0.4
d	4	2.7	2.9	2.2	0.5	3.0	0.3
e	5	1.6	1.9	1.~~3~~2	0.4	2.0	0.4
f	6	0.6	0.9	—		1.0	0.4
					5/2.2		6/23
					0.4		+0.4

Measures of C 14565

	Diam 2nd Ring	Diam 1st Ring (page 131)	Diff 1st & 2nd
a	21.4	22.2	0.8
b	13.3	13.8	0.5
c	7.9	8.6	0.7
d	4.9	5.6	0.7
e	2.9	3.4	0.5
f	1.5	2.3	0.8
			6/40
			+0.7

Monday Nov 23. 1903

Measured distances across image of planet
on E 5985? Measured lens edge of slips on opposite page

~~The~~ Size of aperture = 10mm ~~1.0 cm~~ probably.

		A	B = (10 − A) ½ value	C = ½ B	D
1	Dist. from 1st diffraction ring to same (B)	8.8 mm	1.2	0.6	
2	" " " F " " " "	8.2	1.8	0.9	
3	" " 2d B " " " "	7.7	2.3	1.15	
4	" " " F " " " "	7.3	2.7	1.35	
5	" " 3 B " " " "	7.0	3.0	1.5	

	C	Theoretical value x =	Residual.
1	0.6	0.67	−.07
2	0.9	0.95	−.05
3	1.15	1.16	−.01
4	1.35	1.34	+.01
5	1.5	1.50	.00

Bright $x = \sqrt{1,000(2n)\lambda}$ $\lambda = 0.00045$

Faint or $x = \sqrt{1,000(2n+1)\lambda}$ $1000\lambda = 0.45$

	.45	.90	1.35	1.80	2.25
x =	.67	.95	1.16	1.34	1.50

mm.

0.0005

~~or~~ ~~00.50~~ mm (7

49

0001

1 3

1000 X

.0015

1.50 (1.2

1

50

2

~~34~~ 32

16

2.5 (1.6

2|1.58

1.16

2.0 (1.24

2|1.00

1.2

7

0.5

~~0.0005~~

1st B	1st F	2d B	2 F	3d B
~~.000~~,5	~~.000~~,5	~~.000~~,5	~~.000~~,5	~~.000~~,5
.5	1.0	1.5	2.0	2.5
.7	1.0	1.2	1.4	1.6
	0.3	0.5	0.7	0.9

measures

100	8.8	8.2	~~8.6~~ 7.7 23	7.3 27	7.0 30
	0.6	0.9	1.15	1.35	1.5

mm 4

.6

.97

.02

.02

.0004

inch

.00002

25.4

.000508 (2.02

4

(2) 108

.022

)153 mm

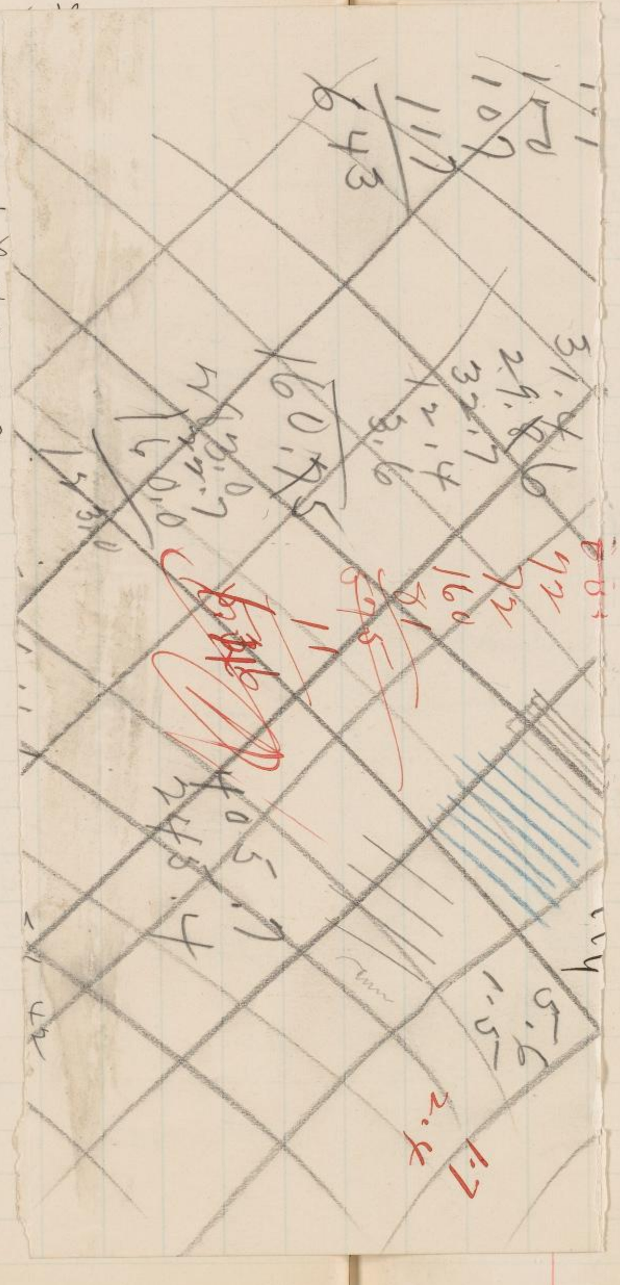
25

4|16000

4000

(~~33~~

31.



$x\sqrt{2a\lambda}$

$x = \sqrt{.2a}$

$b\left(1+\frac{b}{a}\right)$

~~b(1+0~~

$x = \sqrt{b\lambda}$

mm 4

.6

.97

.02
.02
.0004

inch
0.00002
25.4
.000508 (2.02
4
42) 108

mm
.022
4000
~~88,000~~

022

.022

153
25
4/16000
4000

.022
31
61
61
.671

b 1000
9
100 (~~33~~
31.

0.6

0.55

0.9

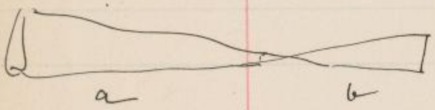
+8	−2
+9	−3
+3	−3
+20	−7
	−6
	−21

Tuesday Nov 24, 1903

Effect of diffraction in out-of-focus images of 11-inch Draper Telescope.

Focus	Dist. theoretical to 1st Ring	Dist. 1st & 2nd Ring
18	+0.38	+0.44
34	+0.55	+0.67

Assume $\lambda = 0.00045$ & that effect is



$\times\sqrt{\frac{b(a+b)}{a}(2n+1)\lambda}$ a = 400 cm b =
b = 16 & 32 cm respectively
for the two cases.

Then for Focus ~~18~~ 34 for which b = ~~16~~ 32 we have

n = 0 1st ring 0.44
n = 1 2nd " 0.7~~8~~6
Diff ~~0.29~~ 0.32 From above dist = ½(+0.67) = 0.34

~~Theoretical value = 0.38~~ 0.44 compared with ~~0.44~~ ½(0.55) gives diff ~~0.06~~ 0.16

Reduced to aperture - 0.~~0~~16 ÷ 0.8 = 0.2 cm for diameter

Focus 18 b = 16
n = 0 1st Ring 0.27
n = 1 2 0.47
Diff 0.20 From above dist. = ½(0.44) = 0.22

~~Theor. value 0.55 compared with 0.27~~
0.27 compared with ½(0.38) gives 0.08 This div by 0.40 reduced to aperture gives 0.2 cm for effect upon diam.

Rough notes on opposite page.

Trans — Theoretical 1 – 1st Rings — 1st – 2nd Rings — Diff

$\frac{18}{34}$ — 2 + 0.38 — 19 — 2 + 0.44 — 0.48 — 0.10

34 — ~~+0.67~~ — 22 ~~+0.54~~

2 + 0.55 — 2 + 0.67 — 0.73 — 0.18

.28 44 (.16 — +0.33

~~153~~ m

.55 : .44 :: .60 :

6
55) 264 (48
220
440

.8) .116 / 2.0

.55 : .67 :: .60
60
55) 40 20 (73
38 5
1.70

$$x = \sqrt{\frac{b(a+b)}{a}(2n+1)\lambda}$$

32
8 cm
.8) .32
400

a = 400
b = 32 & 16

10

25
150
41
4) 1500
375
160

4) 16
400

25
150
750
25
.350

1141
16

4 . 32(432)
400

1.5051
2.6355
4.1406
2.6021
1.5383
2.5385
6.6532
2) 9.2917
9.6458

.8)
1 — 0.44 − .28 = .16 / 2.0 — .00045

3 — 0.76

Diff 1 & 2 — .32 — .33

~~a = 32~~ a = 400
~~b = 400~~ b = 16

16(416) / 400

41
1 = .27 − .19 = .8 / 2.0

3 = .47

Diff .20 — .22

1
0.2041
2.6191
3.8232
2.6021
~~1~~.2211
2.2211
6.6532
2) 8.8743
~~8~~
9.4372

9.2917
0.4771
2) 9.7688
9.8844

8.8743
0.4771
2) 9.3514
9.6757

Saturday April 16, 1904

Measures of images of C 14727 using scale C 14047

	2^s	~~2~~ 1^s	~~3~~ –	2^s	~~2~~ 1^s	–	2^s	1^s	–
2''	5.2	6.6	–	~~4.9~~	~~5.8~~		~~4.9~~	~~6.0~~	
[illegible]	2.4	3.5	8.0						
	5.0	6.0							
	2.5	4.0	8.0						
	3.8	5.0	9.0						
	1.9	3.6	6.5						
	2.4	4.0	8.0						

Of

1.4		~~5.~~
0.9	5.6	4.5
1.0	—	—
1.5	5.5	4.0
1.2	5.2	4.0
1.7	4.6	2.9
1.6	5.6	4.0
7 | 9.3	26.5	19.4
1.3	5.3	3.9

~~1.4~~

2×2×2×2×2

~~32~~ 16

~~4.6~~

5 4

Saturday April 30 1910

Measures of Occ. Plates with Scale C14147

3 35 ~~Daylight~~ used | 4 47 | 8 21 ~~tot~~ Electric light.

	Last.	1 sec	Inter	2 s	~~cent.~~	~~8~~ Last	1 s	2 s	Intermediate
11008	9.0	6.5–	~~intermed~~ 8.5	6.4					
11295–	6.5–	6.0	faint.	5.6					
11547	9.0	8.0	faint	5.0					
12092	7.9	7.0	—	6.5–					
12238	7.0	6.5	9.0	6.0					
12318	7.9	6.8	7.8 Mottled	6.5–					
12466	9.5–	8.8	—	7.5–					
12475–	8.8	7.0	—	6.3					
12682	7.5–	7.0	—	6.4					
12887	9.0	6.5–	—	—					
13036	7.8	7.0	8.0	6.0					
13057	7.0	7.0	9.0	5.0					
13103	8.5–	7.5–	—	6.6					
13565–	7.0	6.5–	9.0	5.9					
13604	6.8 see	6.8	9.0	6.0					
13616	8.0 2	9.0	—	7.8					
13727	7.0	7.0	9.0	6.8					
13729	7.0	6.0	8.0	—					
13779	5.5–	5.4	7.5–	4.6					
14071	9.0	8.0	—	7.6					
14226	9.0*	7.0	9.0	6.0					
14491	8.5–	8.0	—	7.5–					
14536	7.0–	6.5–	—	6.0					
14587	8.9 5	8.0	—	7.4					
14663	8.0	6.0	9.0	—					
14796	8.0	6.0	—	4.0					

Omitted

4 26 Ending

509

* Intermediate image

Saturday April 30 1904 with ... omitted

8 21 · used Measures (continued) Electric light

C	Last	1s	2s	Inter.		1s	2s	10-11
11008	9.0	6.1-	5.5-	9.5-	1.0	6.6	6.0	6
11291-	6.5-	6.2	5.2	—	1.0	6.5-	5.8	7
11547	9.0	8.0	7.0	—	1.0	5.0	4.0	10
12092	8.0	~~6.8~~ 7.4	6.5-	—	0.5-	7.0	7.0	0
12238	7.0	6.5-	5.5-	9.0	1.0	6.5-	6.0	5
12318	7.8	6.9	6.0	~~7.9~~ next to last	0.9	7.0	6.0	10
12466	9.5-	8.5-	7.5-	—	1.0	9.0	7.0	20
12475-	9.0	7.0	6.0	—	1.0	7.0	6.4	6
12682	7.0	6.5-	5.5-	—	1.0	6.5-	6.0	5
12887	~~6.0~~ 9.0	6.0	—	—	—	6.0	—	-
13036	7.8	7.0	5.8	8.8	1.2	6.8	5.8	10
13057	6.5	6.1-	4.8	9.0	0.7	5.0	4.0	10
13103	9.0	7.2	6.5-	—	0.7	7.0	6.4	6
13565-	6.8	6.2	5.6	8.4	0.6	6.7	5.0	17
13604	6.6	6.6	6.0	9.0	0.6	6.5-	6.0	5
13616	8.0	9.0	8.0	—	1.0	8.0	8.0	0
13727	6.8	6.7	6.5-	9.5-	0.2	7.0	6.8	2
13729	7.0	6.0	—	8.5-	—	6.0	—	-
13779	5.6	5.4	4.8	8.0	0.6	5.5-	4.8	7
14071	9.0	8.5-	7.5-	—	1.0	9.0	7.8	12
14226	9.0.. 2 Inter.	6.8	6.0	9.0	0.8	6.5-	6.0	5-
14491	9.0	8.0	7.5-	—	0.5	8.0	7.8	2
14536	7.0	6.8	6.0	9.0	0.8	6.5-	6.0	5-
14587	8.8	8.0	7.2	—	0.8	7.6	7.5-	1
14663	7.8	6.2	—	8.5-	—	6.0	—	-
14796	6.5-	5.6	4.0	—	1.0	4.0	4.0	0

23) 18.9 (.84
18 4
150
138

23) 157 (7
161

10 04

1, [illegible]

Monday May 2 1904

Measures of Occ. Plates Diff Set of images of C14147

	Lst.	1^s	2^s	Intermediate	Diff 1 & 2
C11008	5.5	4.5	3.5	6.0	1.0
11295	4.0	3.8	3.0	—	0.8
11547	5.0	4.5	3.5	—	1.0
12092	5.2	4.6	4.0	—	0.6
12238	4.5	3.8	3.4	5.8	0.4
12318	5.4	4.5	3.6	5.2 next plate	0.9
12466	6.0	5.5	5.0	—	0.5
12475	5.9	4.0	3.5	—	0.5
12682	4.5	4.0	3.5	—	~~0.5~~
12887	6.0	3.8	—	—	1.0
13036	5.0	4.2	3.2	5.8	0.5
13057	4.0	3.5	3.0	5.5	0.6
13103	5.5	4.6	4.0	—	0.6
13565	4.5	3.8	3.2	5.5	0.3
13604	4.0	3.8	3.5	6.0	0.8
13616	5.4	5.8	5.0	—	0.5
13727	4.5	4.3	3.8	—	—
13729	4.0	3.6	—	5.5	0.6
13779	3.2	2.8	2.2	5.0	0.3
14071	5.8	5.5	5.2	—	1.0
14226	~~4.8~~ 6.0	4.5	3.5	6.0	0.1
14491	5.8	5.1	5.0	—	0.5
14536	4.5	3.5	3.0	6.0	0.6
14587	5.5	5.2	4.5	—	0.7
14663	5.0	3.5	—	5.4	—
14796	4.5	3.5	2.0	—	1.5

23) 15.3

Thursday May 5, 1904.

Re-measurement of Oce Plates. New Scale C14816

Daylight. omitted

3 43

	Last	1^s	2^s	Inter.		Last Measures by Mr Clure	1^s	2^s	Inter.
C11008	7.0	4.0	3.0	7.5	1.0	6.4	4.3	3.3	6.8
11295	4.0	$3.\overset{0}{\cancel{8}}$	2.0	7.0	1.0		43		7.0
11547	6.0 Hazy	5.0	4.0	—	1.0				
12092	6.0	$4.\overset{5}{\cancel{0}}$	3.5	—	1.0				
12238	4.5	4.0	3.0	7.5	1.0				
12318	6.0	4.5	3.0	6.0 near to last	1.5				
12466	7.5	6.0	5.0	—	1.0				
12475	~~4.0~~ 7.0	3.8	3.0	—	0.8				
12862	5.0 Hazy	4.0	4.0	—	0.5				
12887	6.5	3.5	—	—	—				
13036	$\overset{5}{\cancel{6}}.0$	4.0	3.5	6.0	0.5				
13057	4.0 Hazy	4.0	3.0	—	1.0				
13103	6.0 Hazy	5.0	4.5	—	1.0				
13563 – Hazy	5.0	3.5	3.0	7.0	0.5				
13604	4.0	4.0	3.0	7.0	1.0				
13616	6.0	7.0	6.0	—	1.0				
13727	5.0	4.5	4.0	7.0	0.5				
13729.	4.0	3.5	—	7.0	—				
13779	3.0	$\overset{2}{\cancel{3}}.5$	2.0	6.0	0.5				
14071	7.5	7.0	~~5.5~~ 6.0	—	1.0				
14226	~~5.0~~ 7.0 Inter.	4.5	4.0	7.0	0.5				
14491	6.0	5.5	5.0	—	0.5				
14536	5.0	4.5	3.5	7.5	1.0				
14587	7.0	6.0	5.0	—	1.0				
14663	6.0	3.5	—	7.0	—				
14796	Hazy 6.0	5.0	4.0	—	1.0				

4 5²

23 | 1.98 | .094
207
90

Thursday May 5, 1904

C, 2239 used

Measures of with C, 14147

1st sec	Sugs	6.0	4.5
Intens	"	6.2	7.0
		~~2.2~~ 2.2	2.5 give f 145

	C 11071 ~~Intens~~	Scale C 14147 .3	Diff		Intens	Scale C 14816 1	Diff
1	9.0	6.2	2.8	13 -3	6.0	3.5	2.5 15
2	6.5	4.2	2.3	17 +1	3.0	1.0	2.0 20
3	6.8	5.0	1.8	2X +6	5.0	1.5	3.5 -08
4	6.2	4.0	2.2	18 +2	3.8	1.2	2.6 14
5	6.9	4.8	2.1	19 +2	4.5	2.0	2.5 -15
6	9.5	6.8	2.7	13 -3	7.0	5.0	2.0 20
7	5.5	3.2	2.3	17 +1	3.5	1.5	2.0 20
8	8.8	6.0	2.8	13 -3	6.0	3.2	2.8 13
9	5.8	3.5	2.3	17 +1 -1	3.0	1.0	2.0 20
10	9.0	6.5	2.5	15	7.0	4.2	2.8 13
			10) 23.8	163 4			10) 24.7 15 8 15 8
			2.4				2.5

mean .16

av dev = ± .023

Mean .16

16.3
15.8
24) 32.1
.16

Resid
-1
+4
-8
-2
-1
+4
+4
-3
+4
-3
+16
-18
10) 34
av dev = ±.034

Thursday May 12 1904 wed.

Measures of images of C 11685 for obtaining duration of intermediate images

Scale C 1414)

Scale C 14816

Bright	Faint			
3.0	5.5	2.5	+5	Images unlike
3.0	5.5	2.5	+5	
7.0	8.0	1.0	−10	
6.5	8.5	2.0	0	
~~6.5~~	~~6.~~		0	
6.5	8.5		20	

2.0

4) 8.0

2.0

5) 1.00

2.0

~~time = 0~~

measures made Jun 3, 1904

time = $\frac{1}{4}$ of bright image.

~~= 0.20 sec.~~

= 0.20 sec.

Wednesday May 25 1904

Measures of C 12239 for duration of intermediate minima.

Scale 14147 ~~Scale C 14811~~

Bright	Faint	Diff		~~9.6~~ ~~7.0~~
6.8	9.5	2.7	.13	~~7.6~~ -3 7.0
5.6	7.8	2.2	.18	+2
5.5	8.0	2.5	.15	-1
5.4	7.6	2.2	.18	+2
5.8	8.0	2.2	.18	+2
4.8	7.2	2.4	.16	0
5.2	7.6	2.4	.16	0
6.4	9.0	2.6	14	-2
			8/ 128	12
		2.2	.16	
See p 143		2.5		

~~8/3 2~~

~~2.4~~

3 2

3 9

Mean 2.4

Wednesday May 25, 1904

Wed Occultation Scale C14616

9h 30m

		Last	1s	Intermediate		
1	11008	7.0	4.2	7.5		f
2	11295	4.0	~~4.0~~ 3.8	7.5		f
3	11547*	8.5	7.0	—		—
4	12092	6.0	5.0	—		—
5	12238	5.0	4.0	7.0		b
6	12318	5.8	4.0	5.6 Next blunt		—
7	12466	7.8	6.0	~~7.5~~		—
8	12475	6.5	4.0	—		—
9	12682*	7.0	6.5	—		—
10	12887	7.0	4.0	—		—
11	13036	6.0	4.6	6.5		b
12	13057*	7.0	6.0	9.0		b
13	13103*	8.5	7.5	—		—
14	13565	4.5	3.5	6.5		f
15	13604	5.0	4.8	7.0		f
16	13616	6.0 2s	~~6.0~~ 7.0	—	2s 6.0	—
17	13727	5.0	4.5	7.0		b
18	13729	4.0	3.0	6.0		f
19	13779	3.0	2.5	5.5		b
20	14071	7.0	6.5	—		—
21	14226*	~~7.0~~ 9.0 Intermediate	6.8	9.0		b
22	14491	6.0	5.5	—		—
23	14536	5.0	4.5	~~[illegible]~~ 7.8		f
24	14587	6.5	5.5	—		—
25	14663	5.5	3.8	6.5		b
26	14796*	6.8	5.5	—		—

10h 21m
Ended

* Measured with Scale C14147

These observations were made June 4 1904

~~The last two intermediate images were to determine & when the~~

The last intermediate image was confused with the next one preceding & when fainter is marked by "f" & when brighter, by ~~f~~ b.

7 b
5 f.

Monday May 30, 1904

und

Measure of C 14838 for duration of intermediate mags.

Scale C, 4147

Star a Bright	Faint		Star b Bright	Faint	
5.5	8.0	2.5	5.3	8.0	2.7
"	~~8.0~~		5.5	8.0	2.5
~~5.4~~	~~8.0~~	2,6			

Scale 14147

Star a B	F			Star b B	F	
2.5	6.0	3.5	.08	2.8	5.8	3.0
2.2	5.8	3.6	0.8	2.2	5.5	3.3
1.0	4.8	3.8	0.7	1.8	4.9	3.1
		3.0	1.1			
		3.3	0.9			
		3.1	1.0			
		2.5	1.6			
		2.6	1.5			
		2.7	1.4			
		2.5	1.6			
			11.5			

mean = 0.12 sec.

Tuesday May 31 1904

used Measures (Continued) of 14838

Scale C ~~14147~~ 14816

Star a			Star b		
B	F		B	F	
2.2	5.8	3.6	1.8	6.0	4.2

Star c

B	F
4.0	7.5
3.8	7.5

3.5

Scale 14816

3.5	0.0	.08
3.6	0.1	.08
3.8	0.3	.07
3.0	0.5	.11
3.3	0.2	.09
3.1	0.4	.10
3.6	0.1	.08
4.2	0.7	.05
3.5	0.0	08
3.7	0.2	.08

~~31.8~~
3.5
= 32
35.3 +3

.74
8
.82

3.5 Mean 0.08

mean

3.6	.08
4.2	.05
3.5	.08
3.7	.06

.11
.09
.08
.08
.07
.10
.80

Scale 14147

2.5	-1	.15
2.6	0	.14
2.7	+1	14
2.5	-1	15
2.8	+2	13

5 | 21
.14

Sum 8 150
5 | 13 1

2.6 = 0.14

14 | 1.4
14

1.41
.15
.16
.10
.10
18 | 192
18
12
.11

2.6
2.5
3.1
3.1

Measures by ~~H~~R. C.
Scale 14147

a

B	F	
5.1	7.7	2.6

b

B	F	
5.0	7.5	2.5

Scale 14816

a

B	F	
2.7	5.8	3.1

b

2.5	5.6	3.1

Tuesday May 31 1904

and Measures (Continued) of 14838

Scale c ~~14147~~ 14816

Star a   Star b

B	F		B	F	
2.2	5.8	3.6	1.8	6.0	4.2

Star c

B	F	
4.0	7.5	3.5
3.8	7.5	3.7

Scale 14147

2.5	-1	.15
2.6	0	.14
2.7	+1	14
2.5	-1	15
2.8	+2	13

5|.21 / .14

Sum 150

5|13 1

2.6 = 0.14

Scale 14816

3.5	0.0	.08
3.6	0.1	.08
3.8	0.3	.07
3.0	0.5	.11
3.3	0.2	.09
3.1	0.4	.10
3.6	0.1	.08
4.2	0.7	.05
3.5	0.0	08
3.7	0.2	.08

31.8 / 3.17

.74 / 8 / .82

-32

35.3 +3

3.5 Mean 0.08

mean

3.6	.08
4.2	.05
3.5	.08
3.7	.06

.11
.09
.08
.08
.07
.10
.80

.80
.16
.15
.14
.16

14 | 1.41 | .10
14
1

2.6
2.5
3.1
3.1

1.41
.15
.16
.10
.10

18 | 1.92 | .11
18
12

und

Tuesday May 31 1904

Measures for duration of secondary image of Ven Star Off.

Plate Σ	7625	7626	7627	7628	7629	7630	7631 ~~7632~~	7632
Play of Relay.	1 rev	1 rev	1 rev	Great	Great	1 rev	1 rev	½ rev
Current ~~Spring~~	Closed	Closed	Closed	Closed	Open	Open	Open	Closed
Gas Spring.	Med.	Light.	Strong.	Strong.	Strong.	Med.	Light	Med
Short	4.0	3.0	4.5-	9.0	6.8	1.8	1.8	4.6
	4.0	3.0	4.5-	8.5-	7.0	2.0	0.8	4.0
	4.5-	2.5-	4.8	8.2	7.0	1.8	0.5- 0.4	4.5-
	3/12.5- -1	3.0	4.8	9.0	6.8	2.2	0.4	4.2
	4.2	2.8	4.5-	8.5-	7.0	1.8	1.0	4.4
		2.8	4.8	9.0	7.0	2.0	0.8 0.5-	4.2
	√	2.5-	6/27.9	8.5-	7.2	2.2	0.3	4.5-
		3.5	4.6 +3	9.0	7.1-	2.0	0.4 0.3-	4.0
		8/23.1 -1		8/5.7 +1	7.0	2.0	0.2	8/24
		2.9	√	8.7.	7.5	2.3	1.5	4.3 °
					9/10.8	2.0	1.0	
		√		√		2.0	1.0	V
					7.1 √ -2	12/24.1 +1	1.0	
						2.0 √	17/12.1 +7 0.8 √	
Long	41.5-	44.0	42.0	36.5-	37.8	43.8	44.0	44.0
	42.0	44.0	42.0	36.0	37.0	43.0	44.5-	44.0
Σ	2)83.5- -1	44.0	42.0	36.5-	37.5-	42.2	44.0	40.0
	41.8 V	44.0	41.5-	37.5-	37.5-	42.8	44.0	39.5-
	4.2	43.0	40.5-	36.0	38.0	43.0	44.0	40.0
~~Duration~~	~~0.~~	5/219.0 °	5/8.0 ° √	36.0	37.0	42.0	43.5-	5/199.5-
	46.0	43.8 √	41.6	6/2.5- +1	37.5	42.8	44.0	39.9 ° √
		2.9	4.6	36.4	7/3.3 -2	42.0	46.0	4.3
		46.7	46.2	8.7	37.5 √	8/5.6 °	45.5	44.2
				45.1	7.1	42.7 √	9/3.0 -1	
					44.6	2.0	44.4	
						44.7	8	
							45.2	
Duration	~~0.10~~ 0.09	~~0.07~~ 0.06	0.10	0.19	0.16	0.04	0.02	0.10

Thursday June 1904

used.

Measures of Star a C14831 with scale C4147

5.2 8.0 2.8 See pp 147-8.

Saturday Jun 4 1904

Measures of Occ. Plate of faint magnitudes (abundance)

3 P.M	No. fr sel.	Mean
11608	3 1	~~7.0~~ 8.5 2
11295	1	9.8 ~~9.5~~
~~47~~	~~3~~	~~7.6~~
~~92~~		
38	3	9.0 ~~7.4~~
~~18~~	—	
~~66~~	—	
~~71~~	—	
~~82~~	—	
~~87~~	—	
36	5	9.4 ~~6.0~~
57	~~4~~ 5	8.5 ~~7.0~~
~~03~~		
65	1	8.8 ~~7.0~~
04	1	9.2
~~16~~		
27	2	8.5
29	3	8.0
X 79	4	5.8
~~71~~		
26	5	10.9 8
~~91~~		
36		
~~87~~		
63		
~~96~~		

x C14816

~~#~~ Saturday June 4 1904
Measures of [illegible] magn of Occ. Plate

8:14 PM
C1100 &
ac ae.
[illegible] at the same as place

	5	4	3	2	1			
1	6.8	6.8	6.8	6.8	6.8		6.8	
2	6.6	D	6.5	6.2	6.4	17	6.4	17^{+1}
3	7.0	7.5	7.2	7.0	7.4	11	7.2	11^{+1}
4	7.2	7.0	7.0	7.0	7.0	2	7.0	2^{+2}
5	6.3	6.8	6.9	D	6.7	27	6.7	27^{-1}
6	7.0	7.3	7.2	7.0	8.0	15	7.3	15^{0}
7	8.8	8.8	8.5	9.0	9.0	41	8.8	41^{+1}
8	7.0	7.1	7.0	7.0	6.8		7.0	49^{-1}
9	7.0	D	6.8	6.5	6.8	31	6.8	31^{-1}
10	6.3	6.7	6.9	6.6	6.8	33	6.7	33^{-2}_{0}
11	6.8	6.8	6.8	6.8	6.8		6.8	
12	6.0	6.0	D	6.2	5.6		6.0	$38^{-\frac{1}{2}}$
13	7.4	7.8	8.0	7.8	7.5	35	7.7	35^{0}
14	6.8	6.6	6.8	6.6	6.9	37	6.7	37^{+2}
15	6.5	6.4	6.6	6.6	6.8	29	6.6	29^{-1}
16	9.0	9.2	9.2	9.0	9.0		9.1	4^{-1}
17	7.0	7.0	7.2	6.8	7.0		7.0	50^{0}
18	6.6	6.4	6.2	6.0	6.3		6.3	15^{0}
19	5.2	D	5.2	5.0	5.5		5.2	9^{+1}
20	8.8	9.0	9.0	8.9	9.0		8.9	47^{+2}
21	6.8	7.0	7.2	7.0	7.0		7.0	50^{0}
22	8.2	8.0	8.2	8.0	8.0		8.1	4^{-1}
23	6.4	6.8	6.5	6.5	6.8 image defective		6.6	30^{0}
24	8.2	8.0	8.~~0~~2	8.0	8.8		8.2	12^{+2}
25	6.0	6.0	6.5	6.2	6.2		6.2	9^{-1}
26	5.6	5.5	6.0	6.0	6.0		5.8	41^{+1}

9:11 P.M.

+13
−11
+2

Monday June 6 1904

Measures same as on preceding page but made by Mr. Olson.

1 18

	5	4	3	2	1			
1	x 6.6	x 6.6	x 6.5	x 6.6	x 6.8	3 ~~6.5~~	6.6	31^{+1}
2	x 6.8	D	x 6.4	x 6.3	x 6.4	~~6.4~~	6.5	$^{-1}19$
3	x 7.1	x 7.4	x 7.5	x 7.5	x 7.4	14 ~~7.3~~	6.4	$^{-1}19$
4	x 7.0	x 6.8	x 7.2	x 6.9	x 6.9		7.0	$^{-2}48$
5	x 6.0	x 6.3	x 6.6	D	x 6.6		6.4	15^{-1}
6	x 6.9	x 7.2	x 6.8	x 7.0	x 7.~~0~~7		7 1	56^{+1}
7	x ~~7~~8.3	x 8.2	x 8.3	x 8.4	x 8.5		8.3	17^{+2}
8	x 6.8	x 6.7	x 6.7	x 6.7	x 6.7		6.7	36^{+1}
9	x 6.8	x ~~6.0~~ D	x 6.9	x 6.8	x 6.7		6.8	32^{0}
10	x 6.5	x 6.3	x 6.8	x 6.5	x 6.4		6.5	25^{0}
11	x 6.7	x 6.7	x 6.6	x 6.8	x 6.7		6.7	35^{0}
12	x 5.6	x 6.0	D	x 6.2	x 6.2		6.0	40^{0}
13	x 7.5	x 7.4	x 7.6	x 7.3	x 7.5		7.5	23^{-2}
14	x 6.6	x 6.6	x 6.7	x 6.7	x 6.5		6.6	31^{+1}
15	x 6.5	x 6.5	x 6.5	x 6.6	x 6.6		6.5	27^{+2}
16	x 9.0	x 8.8	x 9.0	x 9.5	x 9.0		9.~~2~~1	~~6 2~~ 3 ~~+2~~ −2
17	x 6.8	x 6.9	x 7.1	x 6.8	x 6.9		6.9	45 0
18	x 6.5	x 6.3	x 6.4	x 5.9	x 6.2		6.3	63^{-2}
19	x 5.3	D	x 5.7	x 5.0	x 5.4		5.4	14^{-2}
20	x 8.5	x 8.2	x 8.0	x 9.1	x ~~7~~8.2		8.4	20^{0}
21	x 6.8	x 6.8	x 6.7	x 6.8	x 6.8		6.8	39^{-1}
22	x 8.4	x 8.2	x 7.7	x 7.8	x 7.8		8.0	49^{-1}
23	x 6.5	x 6.7	x 6.5	x 6.8	x —		6.6	25 +1
24	x 7.9	x 7.8	x 7.7	x 7.8	x 7.8		7.8	46 0
25	x 5.8	x 6.0	x 5.9	x 5.9	x 6.1		~~6.0~~ 5.9	4~~8~~7 ~~+x~~ +2
26	x 5.6	x 5.6	x 5.5	x 5.9	x 5.6		5.6	32^{+2}

+13

−15

−2

Tuesday June 7. 1904

Measures repeated by Mr Colson. (See preceding pages)

1 4 5 ?

	Beginning 5	4	3	2	1	Ending 5	mean	
1	6.8	6.6	6.5	6.7	6.6	6.6	6.6	38^{+2}
2	6.8		6.3	6.2	6.3	6.5	6.4	~~19~~ 21^{+1}
3	7.2	7.5	7.3 ~~7.3~~	7.3	7.0	7.8	7.4	21^{-3}
4	7.0	7.0	7.1	7.1	7.1	7.1	7.1	4^{-2}
5	6.2	6.8	5.9		6.5	6.6	6.4	20^{0}
6	7.1	7.2	7.1	6.8	7.7	7.1	$7.\overset{2}{8}$	10^{-2}
7	8.1	8.1	8.1	8.6	8.3	8.6	8.3	18^{0}
8	6.8	6.8	6.8	6.8	6.9	6.9	6.8	50^{+2}
9	6.8		6.8	6.9	6.8	6.8	6.8	41^{+1}
10	6.7	6.5	6.7	$6.\overset{6}{8}$	6.5	6.7	6.6	37^{+1}
11	6.7	6.6	6.7	6.8	6.6	6.8	6.7	42^{0}
12	6.0	$6.\overset{0}{7}$		6.5	6.3	6.0	6.2	8^{-2}
13	7.2	7.6	7.5	7.7	7.5	7.5	7.5	30^{0}
14	6.6	6.9	6.8	6.7	6.5	6.7	6.7	42^{0}
15	6.8	6.6	6.7	6.5	6.5	6.6	6.6	37^{+1}
16	8.8	9.0	9.0	9.0	9.1	9.2	9.0	61^{+1}
17	7.1	7.0	6.9	6.9	6.9	7.0	7.0	58^{-2}
18	6.6	6.5	6.2	6.2	6.2	6.6	6.4	23^{-1}
·19	5.7		5.6	5.5	5.5	5.5	5.5	27^{+2}
20	8.5	8.7	8.8	9.0	8.3	8.8	8.7	41^{+1}
21	6.8	7.0	6.9	6.9	6.9	$7.\overset{0}{1}$	6.9	55^{+1}
22	8.1	8.1	7.9	$8.\overset{3}{8}$	7.8	8.1	8.0	63^{+3}
23	6.5	6.8	6.8	6.6	6.8	6.5	6.7	40^{-2}
24	7.8	7.8	7.8	7.7	7.8	7.8	7.8	47^{-1}
25	6.1	6.2	6.0	6.0	6.1	6.0	6.1	4^{-2}
26	5.7	5.7	5.8	5.8 ~~6.0~~	5.8	5.8	5.8	46^{-2}

+15
-20

4 2 6

~~S~~ Friday June 10, 1904

Measures made in the same manner as on preceding pages by Mr. Lyman.

21
~~9~~ 35

	5	4	3	2	1	5			
1	x 6.8	x 6.6	x 6.9	x 6.7	x 6.9	x 6.7	6.8	−2	46
2	x 6.4	D	x 6.2	x 6.0	x 6.3	x 6.6 ~~6.2~~ — this was just "9"	6.3	0	15
3	x 6.8	x 5.8	x 6.3	x 5.5	x 5.1	x 6.2	6.0	−3	57
4	x 6.8	x 6.6	x 6.6	x 7.6	x 6.7	x 6.~~8~~7	6.8	+2	50
5	xx2 5.4 x 4.7	x 6.3	x 6.5	D	x 6.4	x 5.4	86.0	0	50
6	x 7.0	x 6.9	x 7.0	x 6.7	x 7.6	x 6.8	7.0	0	60
7	x 8.2	x 8.3	x 8.1	x 9.0	x 8.9	x 8.2	8.4	+3	27
8	x 7.0	x 6.8	x 6.8	x 6.8	x 7.0	x 6.8	6.9	−2	52
9	x 6.5	D	x 5.6	x 5.8	x 5.9	x 6.4	6.0	+2	52
10	x 5.7	x 6.4	x 6.8	x 6.3	x 6.4	x 5.9	6.2	+3	75
11	x 6.8	x 6.5	x 6.7	x 6.5	x 6.7	x 6.6	6.6	+2	38
12	x 5.3	x 5.2	D	x 4.9	x 4.6	x 5.1	5.0	+1	51
13	x 7.2	x 7.1	x 7.1	x 6.6	x 7.0	x 7.3	7.0	+3	63
14	x 6.5	x 5.6	x 6.2	x 6.0	x 6.1	x 6.5	6.2	−3	9
15	x 6.4	x 6.2	x 6.2	x 6.~~4~~5	x 6.5	x 6.5	6.4	−1	23
16	x 8.8	x 8.8	x 9.3	x 9.3	x 8.9	x 8.9	9.0	0	60
17	x 7.1	x 6.9	x 6.9	x 6.8	x 6.5	x 7.0	~~7.0~~ 6.9	−2	52
18	x 6.5	x 6.2	x 6.4	x 6.1	x 6.0	x 6.4	6.3	−2	16
19	x 5.6	D	x 5.7	x 5.5	x 5.5	x 5.6	5.6	−1	29
20	x 8.5	x 8.5 ~~6.1~~	x 8.8	x 9.1	x 8.3	x 8.3	8.6	−1	~~2~~3 5
21	x 5.8	x 6.6	x 6.5	x 6.2	x 6.6	x 6.5	6.4	−2	82
22	x 7.8	x 7.9	x 7.7	x 7.9	x 7.7	x 7.8	7.8	0	48
23	x 6.5	x 6.9	x 7.0	x 6.8	x 6.7	x 6.5	6.7	+2	44
24	x 7.7	x ~~7.4~~ 7.9	x 7.7	x 7.5	7.8	x 7.8	7.7	+2	44
25	x 6.1	x 6.0	x 6.4	x 6.1	x 6.4	x 5.9 ~~6.0~~	6.2	−3	~~4~~9
26	x 5.1	x 5.2	x 4.4	x 4.8	x 4.7	x 5.2	4.9	0	54
~~27~~									

+20
−2~~2~~

−2

−2~~x~~

23
++ 21 2

Thursday Oct 27, 1904

Focus for 11" Draper tel. to give increase of brightness (neglecting absorption) over pin hole Camera of about $\overset{3.5}{3.0}$ mag.

Length of attachment to tel = 60.9 cm.

From page 128 we have 2.3 as focus of Out-of-focus apparatus.

Using focus of page 130 we have

Magnitude at focus 10.0 =	8.53	8.53	8.53
Required mag	3.50	3.00	2.50
Diff.	5.03	5.53	6.03
	.2	.2	.2
	~~1.006~~	~~1.106~~	
	~~.8865~~	8	
	~~Y~~ 1.0060	1.1060	1.2060
	8865	8865	8865
	1.8925	1.9925	2.0925
	78.1	98.3	~~1236~~ 1237
	2.3	2.3	2.3
	80.4	100.6	1260
	~~5~~60.9	60.9	
	~~21.5~~ 19.5	39.7	

Same for ~~fo~~ values

5.0	4.5	4.0
8.53	8.53	8.53
3.53	4.03	4.53
0.7060	0.8060	0.9060
8865	8865	8865
1.5925	1.6925	1.7925
39.1	49.3	62.0
2.3	2.3	2.3
41.4	51.6	64.3
60.9	60.9	60.9
		3.4

See next page

Thursday Oct 27 1904

Same as on preceding page.

	Foci		
	3.5	19.5	40.0 ~~39.0~~
Length of attachment	60.9	60.9	60.9
	64.4	80.4	100.9
	2.3	2.3	2.3
	62.1	78.1	98.6
	1.7931	1.8926	1.9939
	.8865	.8865	.8865
	.9066	1.0061	1.1074
Diff for Foci 10.0	4.53	5.03	5.54
	8.53	8.53	8.53
	4.00	3.50	2.99

Work done Nov 22 1906

3.0	3.5	19.5	39.5	40.0
61.0	61.0	61.0	61.0	61.0
64.0	64.5	80.5	100.5	101.0
2.3	2.3	2.3	2.3	2.3
61.7	62.2~~8~~	78.2	98.2	98.7
1.7903	1.7938	1.8932	1.9921	1.9943
.8865	.8865	.8865	.8865	.8865
.9038	.9073	1.0067	1.1056	1.1078
4.52	4.54	5.03	5.53	5.54
8.53	8.53	8.53	8.53	8.53
4.01	3.99	3.50	3.00	2.99

79379
88649
190730
45365

Wednesday, March 22, 1905.

Measures of Standard Argand Apertures.

Copied from C.S.M. No 18 pp 30 & 22.

	Disc A	Measures of diameters at right angles to each other.		Mean	mm	
Aperture	1A	1917	1.904	1.910	2.02	✓
	2	2.499	2.448	2.474	2.62	✓
	3	3.128	3.149	3.138	3.32	✓
	4	3.864	3.878	3.871	4.10	✓
	5	4.890	4.911	4.900	5.19	✓
	7	7.687	7.631	7.659	8.11	✓

	Disc C					
Aperture	2	2.022	2.025	2.024	2.14	✓
	3	2.371	2.332	2.352	2.4~~8~~9	✓
	4	3.040	3.018	3.029	3.2~~0~~1	✓

	Disc A	m.m	log		Mag.
	1	1.23 from [illegible]	0.0899	0.6262	3.13
Aperture	1A	2.02	0.3054	0.6417	4.21
	2	2.62	0.4183	0.9546	4.77
	3	3.32	0.5211	1.0574	5.29
	4	4.10	0.6128	1.1491	5.75
	5	5.19	0.7152	1.2515	6.26
	7	8.11	0.9090	1.4453	7.23

	Disc C				
Aperture	~~3~~ 2	2.14	0.3304	0.8667	4.33
	~~4~~ 3	2.48	0.39~~45~~62	0.93~~08~~25	4.6~~8~~6
	~~5~~ 4	3.20.	0.50~~51~~65	1.04~~4~~28	5.21

Friday March 24 1905

Measures of Apertures (new) of Phot. D
from page 68

Aperture	Aperture cm.	log of $\tan\frac{\theta}{2} = \frac{\text{Aperture}}{2f}$	log $\tan\frac{\theta}{2}$	log $\sin\frac{\theta}{2}$		Magnitude
17	15.80	0.3950	9.5966 ✓	9.5651	3.4024 ~~57278~~	17.01
16	9.48	0.2370	9.3748 ✓	9.3629	3.2002	16.00
15	6.8~~[illegible]~~8	0.1720	9.2355 ✓	9.2292	3.0665	15.~~0~~93.
14	~~6~~ 3.70	0.0925	8.9661 ✓	8.9643	2.8016	14.0~~[illegible]~~1
13	2.40	0.0600	8.~~3802~~ 7782	8.7774	2.6147	13.07
12	1.45	0.0362	8.~~1614~~ 5587	8.5584	2.3957	11.98
11	0.92	0.0230	8.~~9638~~ 3617	8.3616	2.1989	10.99
10	0.58	0.0145	8.1614	8.1614	1.9987	9.99

Distance from Plate 20.00 cm. = f

$\log\sin\frac{\phi}{2} = 6.1627$

$M = 5\left(\log\sin\frac{\theta}{2} - \log\sin\frac{\phi}{2}\right)$

$2f\tan\frac{\theta}{2} =$ ~~19.95~~

2×19.45 × $\tan\frac{\theta}{2}$

$\tan\frac{\theta}{2} = \frac{\text{~~2~~ aperture}}{2f}$

$\log\sin\frac{\phi}{2} =$ ~~6.113~~ 6.1627

~~$\tan\frac{\theta}{2}$ — θ — $\log\sin\frac{\theta}{2}$~~

Formula of Reduction
See Book Phot. Measures
of light pages 8 & 27

Wednesday April. 5. 1905.

Copy of Measures from C.S.M. No 17 Page 204 & 5

C 14489

7	A	3.728
		3.748
9	B	3.740
		3.763
11	C	3.727
		3.742
13	D	3.698
		3.716
15	E	3.707
		3.702
17	F	3.673
		3.677

Shade (A–C) No Shade (D–F)

	No Shade	Shade
A	3.728	3.748
B	3.740	3.763
C	3.727	3.742
	11.195	11.253
	11.253	
	6) 22.448	
	3.741	

	Shade ~~No Shade~~	
D	3.698	3.716
E	3.707	3.702
F	3.673	3.677
	11.078	11.095
	11.091	
	6) 22.173	
	3.696	

			Mean
Diff. A+B+C	3.732	3.751	3.741
D+E+F	3.693	3.698	3.696
			.045

C 14488 Image ~~7~~ 11 C ~~No Shade~~ ~~Shade~~

3.703
3.701
Mean 3.702

Image ~~9~~ 13 D Shade ~~No Shade~~

3.747
3.772
~~3) 119~~
3.760

Wednesday April 12 1905

Effect of Shade on account of thickness (Continued fr preceding page)

	Shade	No Shade	Diff.
C 14488	3.702	3.760	0.058
C 14489	3.696	3.741	0.04~~6~~ 5
Mean	3.699	Mean 3.750	0.052

log 0.052 8.71600
3.750 0.57403
.2 8.14197

log 3.750 0.57403
3.699 0.56808
~~0.56773~~
.2) .00595
0.0298

for shade at "when used Diff = 0.03 magnitudes.
rge width out- of focus apparatus
10.0.
To be added to the absorption found.

Shade should make smaller image, thus increasing the light. This corresponds to above result.

CTT

C14489

3.698 .716 = 3.707
.707 .702 3.704
.673 .677 57³ 3.675
3.696

3.728 .748 3.738
.740 .763 3.752
.727 .742 4/248 3.734
3.741
.045

C 14488

C 3.703 3.701 3.702
D 3.747 3.772 3.760

Saturday ~~Friday~~ April 15 ~~14~~, 1905.

Measures for Motion in line of sight for Companion ~~HP 2~~ HP 2264 (G. Urs Maj.)
From C.S.M. No 18. ~~pp 35, 36.~~
pp 33 – 36

Measures of K lines in spectra of primary(1) & component(2)
~~C 15583~~

	K_1	K_2	H_2	Differences $H_2 - K_1$	 $K_2 - K_1$
C 15583	23.022	23.252		—	0.230
	23.098	23.320		—	0.222
C 15657	25.155	24.928 ~~25.240~~	26.220 ~~26.13~~	1.065	0.227 ~~0.085~~
	25.240 ~~24.926~~	25.002	26.139 *	0.899	0.238 ~~0.237~~
C 15583	26.622		27.602	0.980	—
	26.711		27.698	0.987	—
C 15643	27.180	27.419	28.170	0.990	0.239
	27.273	27.505	28.258	0.985	0.232
C 15583	27.934	27.724	28.928	0.994	0.210
	28.021	27.792	29.002	0.981	0.229
C 15657	~~28.628~~	~~27.637~~	~~27.870~~ 27.870	58 ~~42~~	
	~~28.714~~	~~27.732~~	27.944		
	~~27.634~~				
	27.637	27.870	28.628	0.991	0.233
	27.732	27.944	28.714	0.982	0.212

* These measures made separately ~~[illegible]~~ other lines [illegible] from perfect.

Saturday April 15. 1905.

Continued from preceding page.

C 15583 1st	$K_2 - K_1$ = 0.226	K_1 to H_2 = 0.984	.230 29 ~~.27~~
* C 15583 2d	0.220	0.988	0.222
* C 15643	0.236	0.988	0.239
C 15657 1st	0.232	0.982	0.236
* C 15657 (2)	0.222	0.986	0.225
C 15657 (3)	0.209	0.983	0.212
C 15583 (3)	0.228	0.990	0.230

* More reliable

Friday April 21 1905

Copy of measures from C. S. M. No 18 of 31

(3) C 15657

~~#~~K_1	K_2	H_2	$H_2 \sim K_1$	$K_2 - K_1$
54.826	55.042	53.843	.983	.216
.916	.118	.933	.983	202

(3) C 15583

47.769	48.002	48.759	.990	.233
.862	.085	.851	.989	.223

Monday April 24, 1905.

Measures of D 11295 by ~~D~~ E 7924.

The plate is used as a ~~[illegible]~~ diagonal scale to determine distances for intersection of 18th & 22nd lines ~~to~~, the sides of a square making the 8nd, 33rd & the 7th & 67th lines.

1st Center ~~8~~ (22, 33)

~~Sm~~ −1.5 +4

+7 −6

~~#~~ 8.5 10

8.5

~~18.5~~

18.5

1.5

92.5

185

27.75

22500

27.75

22472.25

149.91

~~2nd~~ +2 +3.5

+4 −2.5

2 6.0

2

8

4

32

22500

32

22~~4~~68

149.90

~~3rd~~

−2.5 0

−10.0 −7

1.5

8.5

5.5

42.5

425

46.75

22500

46.75

22453.25

149.84

~~4th~~ +2 0

+9.5 10

7.5 10

17.5

2.5

87.5

350

43.75

22500

43.75

22456.25

149.85

Monday April 24 1905

Measures (continued)

2nd Center to (22, 3)

		225	149.95
		14.	
+2.5	+5	22486	
+5.8	0		
3.3	5		
	3.3		
	8.3		
	1.7		
	581		
	83		
	~~1391~~		
	1411	22500 8 90	~~149.97~~ 96
		22492	
-1.5	0	90	
8	10		
9.5	10		
	9.5		
	19.5		
	0.5		
	9.75		

+3	+4	22500	149.96
+8.5	-2.5	12	
5.5		22488	
	6.5		
	5.5		
	12.0		
	1.0		
	12.0		

+3	-4		
-2.5	+2	22500	
		6	
5.5	6	22494	149.98
	5.5		
	2) 11.5		
	5.8		

Monday April 24 1905

3rd Center ϖ (18.37)

+3	0	22500	149.94
+12	−10	19	
9	10	22481	
	9		
	19		
	1		

$+2.\overline{5}$	$+\overline{5}$		
+7.	$-2.\overline{5}$	225 1	
~~5.5~~	$7.\overline{5}$	26	~~149.92~~
	5.5 1	22476	
	13.0		
	2		
	26		

$+4.\overline{5}$	$+3.\overline{5}$		
$+7.\overline{5}$	−2	$22\overline{5}$ 21	
3.0	$5.\overline{5}$	22479	149.93
	3.0		
	8.5		
	2/2		
	17.0		
	4 2		
	21		

$+\overline{5}$	$+3.\overline{5}$		
+9.8	$-3.\overline{1}$	$22\overline{5}$ 26	
4.8	7.0	22474	149.91
	4.8		
	11.8		
	2 2		
	236		
	236		
	2596		

Monday April 2~~8~~4 1902

~~3d~~ 4th Centre to (7.18)

+2.5
+4
~~7.5~~
6.5

+5
−2.5
7.5
6.5
13.0

225
13
22487

149.96

+2.5
+12
9.5

0
−10
10
9.5
2) 19.5
9.8

22490

149.97

+4.5
+11.5
7.0

+3.5
−5
8.5
7.0
15.5
1.5
7 7 5
15 5
23125

22500
23
22477

149.92

+3.5
10
6.5

5.0
−3
8.0
6.5
14.5
7.2
22

225
22
22478

149.93

+3
+11.5
8.5

+2
−8.5
10.5
8.5
19.
2
38

225
38
224 62

149.86

+3
12.5
9.5

+3.5
−7.5
11.0
9.5
20.5
10 2
31

225
31
224 69

149.90

+2.5
+9.
6.5

+5
−3
8
6.5
14.5
7 2
22

225
22
224 78

149 92

+4
+13
9

0
−10
10
9
19

224.81

149.94

pt

Centre ~~to~~ (22, 33)

+2.5 +5. 225 91
+8.5 −3 28 = 149.~~86~~
6.0 8 224~~6~~2
72
6
14
2
28

+1.2 0 225
+9.2 10 56 149.88
8 10 22464
8
18
2
56

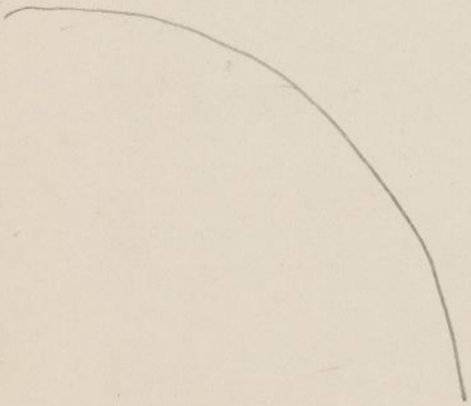
+4 +3
+7 −3.5 225
3 6.5 33
3 22467
9.5
3.5 149.89
47.5
28.5
33.25

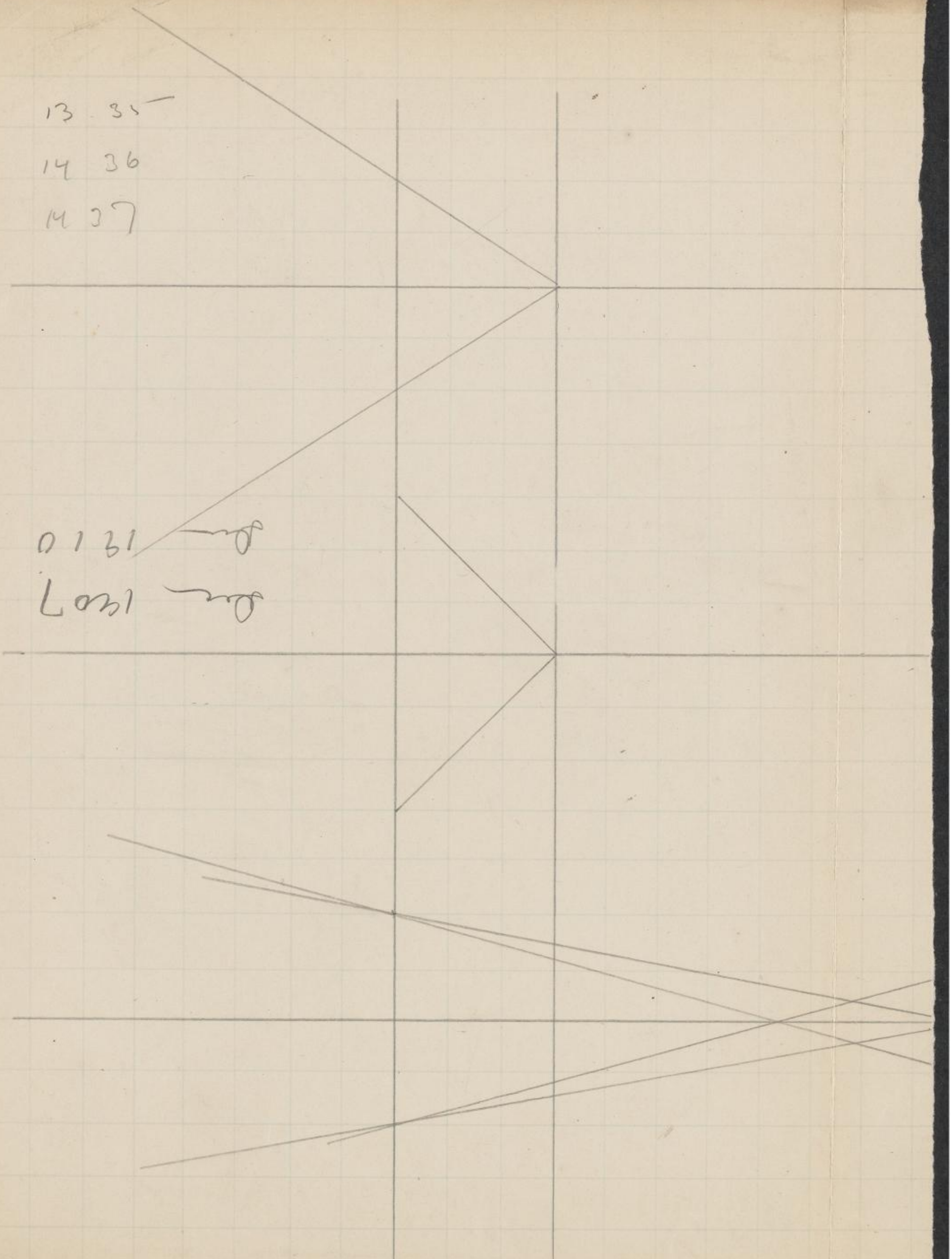
+2.5 +7 225
+8 −1 34
5.5 ~~6~~8 22466 149.89
5.5
~~11.5~~
13.5 1/2
2 1/2
27
3
24

$$\frac{dx}{dy} = \frac{\left((r-x)^2 - a^2\right)^{\frac{1}{2}}}{r-x}$$

$$\frac{dx}{dy} \quad (r-x)^2 - a^2 = (r-x)^2$$

$$x = 0 \text{ then } \left.\frac{dx}{dy}\right]_{x=0} = \frac{\left(r^2 - a^2\right)^{\frac{1}{2}}}{r}$$





13 35

14 36

14 37

Dec 1907

Dec 1910

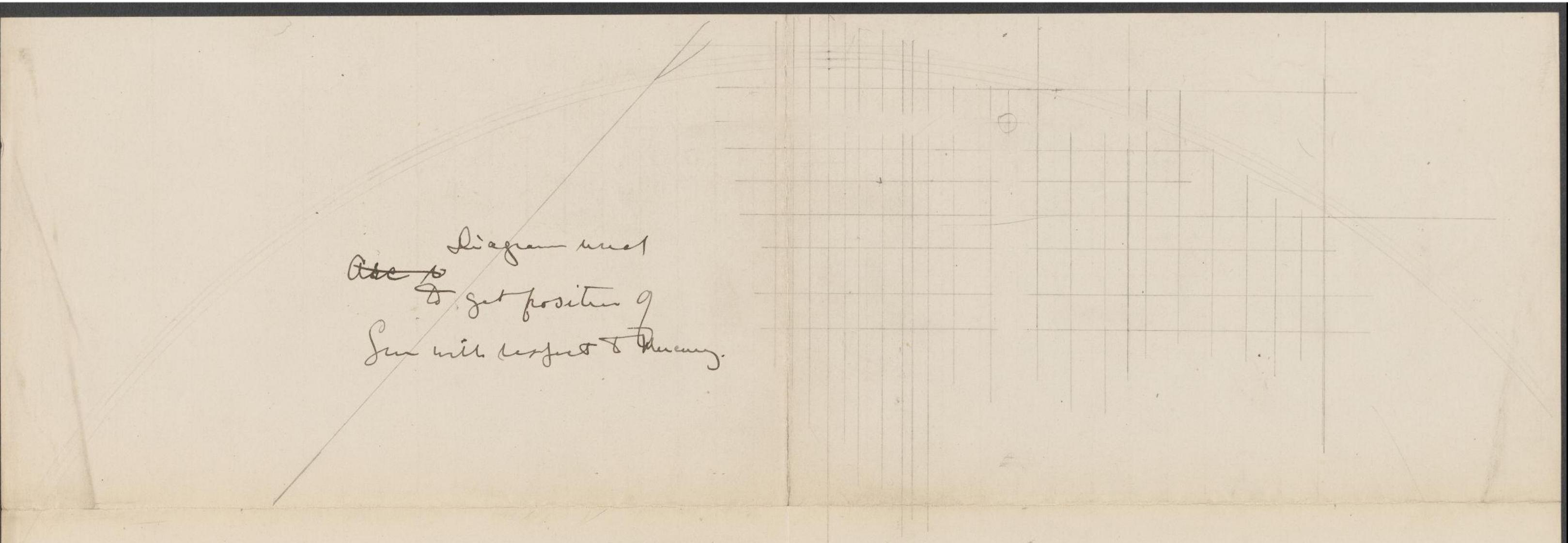
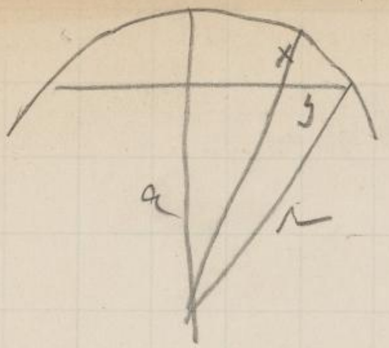


Diagram used
~~Att to~~ to get position of
Sun with respect to Mercury.



$$y = (r^2 - a^2)^{\frac{1}{2}} - \left((r-x)^2 - a^2\right)^{\frac{1}{2}}$$

$$dy = -\frac{1}{2}\left((r-x)^2 - a^2\right)^{-\frac{1}{2}} 2(r-x) - dx$$

$$\cancel{= \frac{r-x}{(r-x)^{\frac{1}{2}} - a^2} dx} = \frac{r-x}{\left((r-x)^2 - a^2\right)^{\frac{1}{2}}}$$

$$\frac{dy}{dx} = \cancel{\frac{1}{(r-x) - \frac{a^2}{r-x}}} \qquad x=0 \qquad \frac{r}{(r^2-a^2)^{\frac{1}{2}}}$$

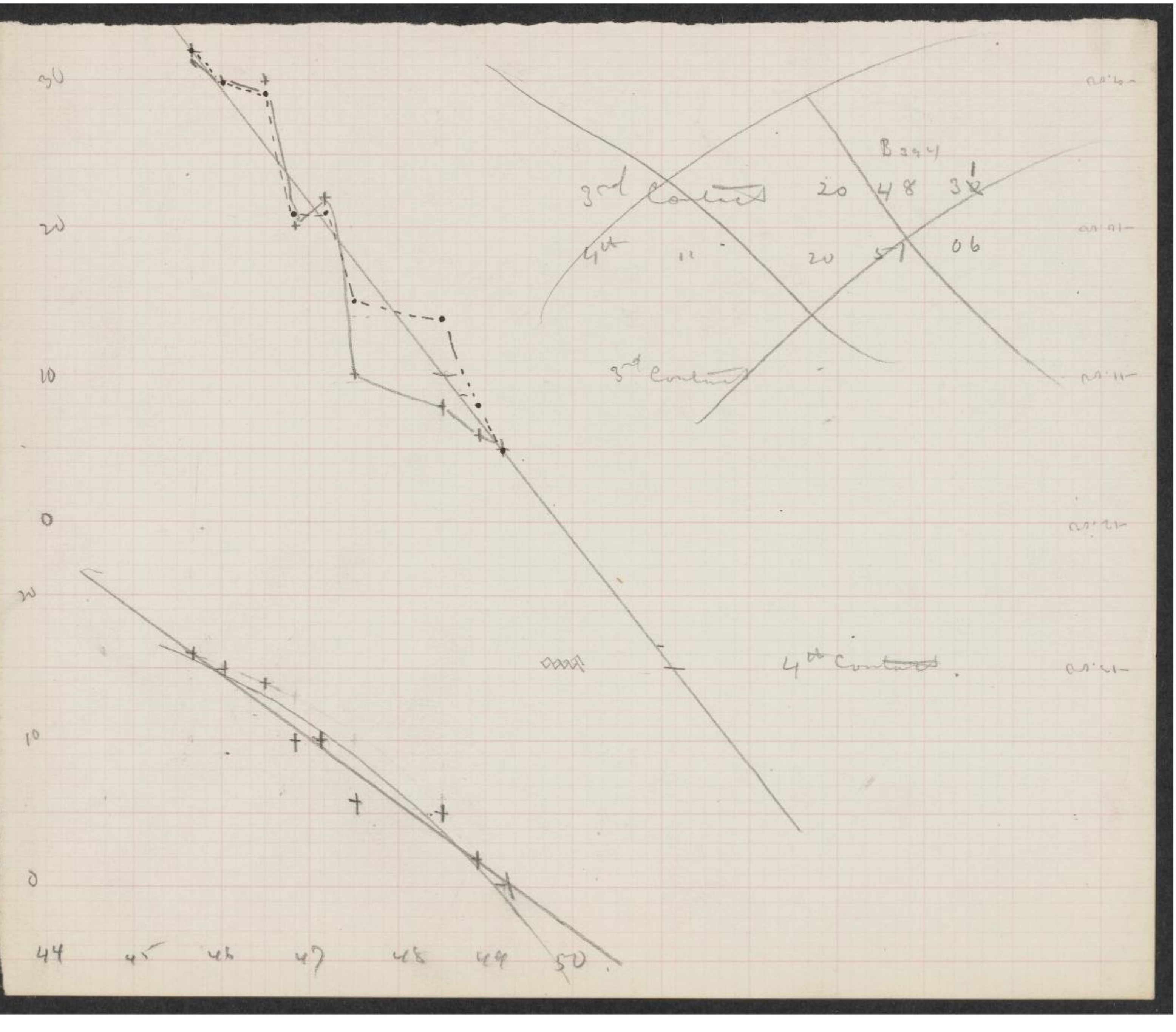
$$\cancel{x=0 \quad \frac{1}{r - \frac{a^2}{r}} = \frac{r}{r^2-a^2}}$$

$$x = r-a \qquad \frac{\cancel{r-r}+a}{}$$

$$\Big(a$$

Pin-holes

24.00	24.00	24.00	
21.00	21.00	21.00	3.00
20.19	20.19	20.19	3.81
19.66	19.65	19.66	4.34
19.20	19.21	19.20	4.80
18.72	18.72	18.72	5.28
18.12	18.12	18.12	5.88
17.95	17.95	17.95	6.05
17.53	17.52	17.52	6.48
17.31	17.31	17.31	6.69
16.85	16.85	16.85	7.15
16.42	16.42	16.42	7.58


30
20
10
0
20
10
0
44
45
46
47
48
49
50
B 334
3rd Contact
20 48 3~~2~~1
4th "
20 57 06
3rd Contact
4th Contact

Sun

+1
+11.5
10.5

+2
−9.5
11.5
10.5
22

225
22
22478

149.93

+2.5
−2
4.5

−4
+3
7
4.5
11.5
2.5
57.5
230
2875

225
24
22471

149.90

See page 165

149.91	+2
90	+1
84	−5
85	−4
91	+2
88	−1
89	0
89	0
93	+4
90	+1
90	+10 −10

Mean 149.89

$10)\overline{20}$
±2

2^d Center to (22.3)

2.5 5.0
7.8 -1. 22492 149.98
5 5.3 6.0
5.3
11.3
.7
7.9.1

+2 0
0 +11 -10 22481 149.94
9 10
4
19

+4.5 +3.8
+10 -2.1 22491 149.97
7 5.5 6.3
5.5
11 8
8
9.44

+2.5 0
8 +8.0 -7 22481 149 94
5.5 7
5.5
12.5
6 2
19

9th

2.5
14.0
11.5

0
~~11~~ 12.2
12.2
11.5
23.7
.7
16.59

22483

149.94

10th

+4
+13.5
9.5

+2.8
−8.0
10.8
9.5
20.3
1.3
609
203
2639

225
26
22474

149.92

See page 166

149.95	−1
98	+2
96	0
98	+2
98	+2
94	−2
97	+1
94	−2
94	−2
92	−4
56	+7 −11
Mean 149.96	10) 18
	± 2

Monday

3rd Cento t (1837)

5th +2.5 +5.

10.2 −4 22478 149.92

7.7 9

7.7

16.7

1.3

501

167

2171

+2.1 0

6d +12.0 −10 22490 149.97

9.5 10

9.1

2/ 19.1

9.8

+2.5 +3.0.

7th +12.8 −8.0

10.3 11.0 22484 149.95

10.3

21.3

7

1631

8th +3 +4.5

+10.8 −4.0

7.8 8.5 22489 149.97

7.8

16.3

7

1141

Monday April 24 1905

9th +2.5 +6.2
+12. −4.2
9.5 10.4 22482 149.94
9.5
19.9
.9
17.91

10th +3.8 −2.5
−2.5 +4.5
6.3 7.0 22491 149.97
6.3
13.3
.7
9.31

See page 167

149.94	0
92	−2
93	−1
.91	−3
92	−2
97	+3
95	+1
97	+3
94	0
97	+3
42	+10
	−8
Mean 149.94	10/18
	± 2

Monday

3rd Centre t (1837)

5th
+2.5 +5.
10.2 −4
7.7 9
7.7
16.7
1.3
501
167
2171

22478 149.92

6d
+2.1 0
+12.0 −10
9.5 10
9.5
2/ 19.5
9.8

22490 149.97

7th
+2.5 +3.0
+12.8 −8.0
10.3 11.0
10.3
21.3
7
1631

22484 149.95

8th
+3 +4.5
+10.8 −4.0
7.8 8.5
7.8
16.3
7
1141

22489 149.97

Monday April 24 1905

9th

+2.5
+12.
9.5

+6.2
−4.2
10.4
9.5
19.9
.9
1791.

22482

149.94

10th

+3.8
−2.5
6.3

−2.5
+4.5
7.0
6.3
13.3
7
931

22491

149.97

See page 167

149.94	0
92	−2
93	−1
.91	−3
92	−2
97	+3
95	+1
97	+3
94	0
97	+3
42	+10
	−8
Mean 149.94	10/18
	± 2

Monday April 24 1905

Center to (7 18)

+2.5	+5	22476	14992
+7.5	−2		
5.0	7		
	5		
	12		
	2		
	24		

3.0	0		
12.3	10	22484	149.95
9.3	10		
	9.3		
	19.3		
	7		
	1551		

See page 168

149.96	+4	+3
97	+5	+4
92	0	−1
93	+1	0
86	−6	−7
90	−2	−3
92	0	−1
94	+2	+1
92	0	−1
95	+3	+2
7	+15	10
2~~7~~		−13
		10/23
		±2

Mean 149.9~~2~~ 3

Tuesday " " April 25 1905

Center of 7.181 remeasured by using lines
14.5 cm apart instead of 15 cm.

+2.5
+41
38.5

0
−5
5

43.5
33.5
2175
1305
1305
1457.25

145
145
725
580
145
21025
1457
22492

149.94

Tuesday April 25 1905
Measure distance from
Centre ~~to~~ (7-14) on D11337

~~0~~ +2.5	+5	225	
10.5	-4.5	26	
8.0	9.5	22474	149.91
	8		
	17.5		
	8.8		
	26.3		

+2.5	0		
+9	-8		
6.5	8	22478	149.93
	6.1		
	14.5		
	7.2		
	21.7		

0	-3		149.96
+6	-10.5	22486	
6	7.5		
	6		
	13.5		

-0.7	-2.8		
+6	-10		
6.7	7.2	22493	149.98
	6.7		
	½) 13.9		
	6.9		

Tuesday April 25 1905

+3 0

+11.5 −10

8.5 10 22472 149.91

8.5

18.5

92

27.7

+2.5 −5.0

12.6 −16.0

10.1 11.0 22500

10.1 19

21.1 22481

9 149.94

18.9.9

+2 −2

−3 +5 22576

5 7 149.92

5

12

2

24

2.6 0

12.0 −10

9.4 10 22488 149.96

9.4

19.4

6

11 6.4

Tuesday April 25 1905

+3.5
+10.5
7.0

+2.5
−6.
8.5
7.0
15.5
78
233

22477

149.92

+4.5
+10.
5.5

0
−8
8
5.5
13.5½
2½
27 0
68
238

225
34
22466

149.88

149.91	−2
.93	0
.96	+3
.98	+5
.91	−2
.94	+1
.92	−1
.96	+3
.92	−1
.88	−5
10) 31	+12
	−11
	10) 23
	± 2

Mean 149.93

Tuesday April 25 1905

Measure 30 div of reticule (i.e. ~~contact~~ of copy of original) on D #11337

~~+5~~

+2.5   +2.5

+10.0   −5.5

7.5   8.0   ~~149~~

7.5   22492

2) 15.5

7.8   149.98

Wednesday May 24, 1905

Effective aperture of [illegible] Pin-hole Camera for testing Brightness of sky at Waverly & other places.

~~Try~~ From ab. No 7 p 71 we have
Aperture 24.5 x 24.6 cm at 47.2 cm from plate

24.5 20
24.6
1470
980
490
602.70
~~20~~
~~47.2) 1205400 (2553~~
~~944~~
~~2614~~
~~2360~~
~~2540~~
~~2360~~
~~1800~~
~~1416~~

2
log 602.70 ~~2~~.78010
log 400 ~~8~~.60206
5.38216
3.34788
2.03428
108.2

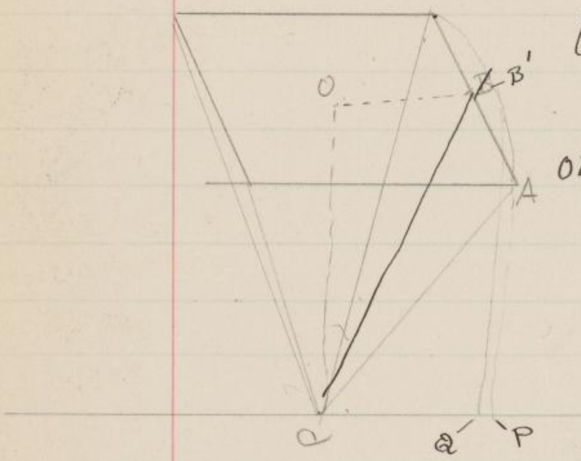
log 47.2
1.67394
2
3.34788

Dia aper 16 of Photom 9.48 cm

0.97681
2
1.85362
0.49715
2.35077
0.60206
1.74871
56.1

~~Mon~~ Thursday Nov 16 1905

Effective aperture of Pin-hole Camera of preceding page

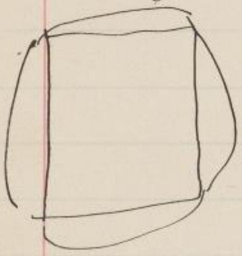


CO = ~~23.6 cm~~ 47.2 cm

OB = AB = 12.3 cm.

Horizon plane.

Effective aperture compared with circle circumscribed about the square will be as the areas ~~of the~~ projected on the horizontal plane.



The projection of the aperture will be a figure bound by portions of 4 ellipses which are the projections of 4 great circles.

Let Q & P be the projections of B' & A.

~~log~~ 23.6
23.6
1416
708
472
556.96
302.58
$\overline{AC}^2$ = 859.54

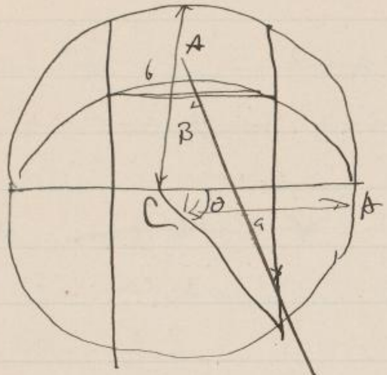
12.3
12.3
369
246
123
151.29
2
302.58

log $\overline{AC}^2$ = 2.93427
log AC = 1.46714 = log Semi-major axis of ellipse = CB'

log 12.3 = 1.08991
log 23.6 = 1.37291
log tan ~~angle~~ B'CQ 9.71700
~~log cos~~ tan of 27° 31.7
62° 28.3
log cos ~~9.947~~ 9.66482
log CB' 1.46714
1.13196 = log CQ
= log semi-minor axis

302.58
2
605.16

Thursday, Nov 16, 1905.



Area A of circle is to area B of ellipse
as ~~a to B~~. a is to b.

log a = 1.46714

log b = 1.13196

$\overline{AC}^2 = 859.54$

$\overline{OB'}^2 = 151.29$ 2)

log 708.25 = 2.85019

~~log a 1.46714~~

~~log tan θ 1.38305~~

~~θ =~~ 1.42510

log a 1.46714

log tan θ 9.95796

θ = 42° 13′.9

42°.232 ~~θ~~

Area triangle

log x 1.42510

log 12.3 1.08991

2.51501

327.35

Area sector.

log a^2 = 2.93427

log π = 0.49715

log area circle 3.43142

log 42.232 1.62564

5.05706

log 180. 2.25527

log area sect 2.80179

∴ Area sector = 633.56

Area triangle 327.35

area segment. 306.21

Area A = Area ½ circle − area segment

area ~~circle~~ = 2)2700.4

½ circle 1350.2

Segment 306.2

area A 1044.0

log A = 3.01870

log b 1.13196

4.15066

log a 1.46714

log area B 2.68352

47.2
47.2
944
3304
1888
2227.84
302.58
2530.42 = AC²

log = 3.40319

log AC = 1.70160 = log a

12.3
12.3
151.29
2
302.58

log 12.3 = 1.08991
log 47.2 = 1.67394
log tan B'CQ 9.41597

tan 14° 36'.4

log sin 9.40181
log CD' 1.70160
log b = 1.10331

b = 12.69

AC² = 2530.42
(½ secant line)² 151.29
~~Perpendicular~~ 2379.13

log = 3.37641

log ½ secant) 1.68820
log a 1.70160
log ~~tan~~ sin θ 9.98660
75° 50'
~~14° 7'~~
θ =
75.833
= ~~44°.127~~

area Δ

1.68820
log 12.3 1.08991
2.77811

599.94 area Δ

log a² = 3.40319
log π 0.49715
3.90034
3.87986
log ~~44.117~~ 75.833 1.64461
~~5.54495~~
5.78020
2.25527
~~3.28968~~
3.52493

area Sector ~~1948.4~~
3349.1
area Δ 599.9
area segment = ~~1348.5~~
2749.2

area circle = 7949.5
½ circle = 3974.75
2749.2
segment ~~1348.5~~
area A = ~~2626.3~~
1225.6
log b log A = ~~3.41934~~
3.08833
log b = 1.10331
~~4.52265~~
4.19166
log a 1.70160
~~2.82105~~
log area B 2.49006

area B = 662.3
4
2649.2
area □ 605.2
2044.0

area Proj =

area B = ~~3090~~
309.07
4
1236.28
605.2
631.1

area Projection = 631.1 ~~2044.0~~

CP² = 302.58
~~log π =~~
log CP² = 2.48084
log π = 0.49715
2.97799
log area B = 2.80010
.4) 0.17789
0.4447

Value of circular aperture.

1.24042
log 47.2 1.67394
9.56648

log tan σ/2 log sin ½ b = 9.53882
6.1627
3.3761
16.88
44
16.44 magnitude
value of aperture

24.6
24.6

log 24.6 1.39094
2
2.78188
0.49715
2) 2.28473
1.14236

~~13.~~

1.14236
1.67394
9.46842

9.4504
6.1627
13.2877
57
~~16.44~~ 3
16.4385

Computation when ~~[illegible]~~ a circular area is taken equivalent to the square of [illegible]

Thursday Nov 16 1905

area B = 482.52
4
1930.08
~~605.16~~

1930.08
·302.58
1627.50 = area of projection of apert.

~~Sq. of~~
Sq of rad of projected circle circumscribed about square
~~that~~ is CP^2 = 302.58

~~2.480884~~
2.48084✓
log π 0.49715
2.97799
area B 3.21152
.4 0.233 5-3
0.58.

log r = 1.24042
~~dist~~ =
log

Value of circular aperture (log r = 1.24042) at dist. 23.6 cm

1.24042
1.37271
log tan $\frac{\theta}{2}$ 9.86751.
36° 23'.6

log sin $\frac{\theta}{2}$ = $9.773\overset{3}{\cancel{2}}9$
6.1627
3.6106
5
18.05 ~~30~~
0.58
17.47

~~26 11 14~~ 26
26 15 = 26
$\frac{17.6}{10.2}$

Thursday Feb 1 1906

Settings of the Enl. App with Old Cooke Lens

~~Dis~~ Readings

Lens	Easel	Enl
26.30	53 1/4	1.0
25.00	53 1/4	1.10
26.00	53 1/16	1.01
27.00	53.00	0.94
24.00	53 ~~3/8~~ 7/16	1.20
23.00	53 15/16	1.31
22.00	54 13/16	1.41
21.00	56 1/4	1.65
20.00	58 3/8	1.88
19.00	61 3/8	2.17
18.00	66	2.62
17.00	73 15/16	3.30
16.00	87 1/8	4.38
15.50	98 7/16	5.29
15.00	114 3/8	6.54
14.50	141 3/4	8.65
14.00	197 1/4	12.20
13.88	216 3/4	14.40

Thursday Feb 1 1906

$$D = F\frac{(E+1)^2}{E} + C$$

From end 2.62 & 14.40

From end $\overset{1.65}{\cancel{2.17}}$ & 12.80 we have value F = 13.145

~~Call F =~~

$56\tfrac{1}{4} = \cancel{F}\ 4.256\,F + C$

$197\tfrac{1}{4} = 14.943\,F + C$

$141 = 10.687\,F$

∴ $F = 13.1\overset{5\,2}{\cancel{78}}$ inches.

~~log F = 0.12036~~

Call F = ~~13.148~~ ~~13.15~~ inches.

log 13.15

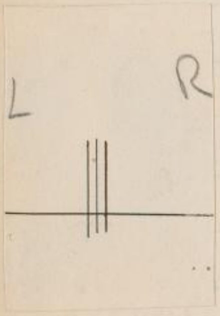
Makers mark is 13.2 inches.

(1) E	$0.9\overset{4}{\cancel{5}}$	1.01	1.20	1.31	1.41	+ 1.65	1.88	2.17
(2) log E ~~+1~~	0.28780 ~~0.01703~~	0.30320	0.34242	0.36361	0.38202	0.42325	0.45939	0.50106
	~~9.97313~~	~~0.00432~~	~~0.07918~~	~~0.11727~~	~~0.14922~~	~~0.21748~~	~~0.27416~~	~~0.33646~~
(3) log $(E+1)^2$	~~9.94626~~	~~0.00864~~	~~0.15836~~	~~0.23454~~	~~0.29844~~	~~0.43496~~	~~0.54832~~	~~0.67292~~
	0.57560	0.60640	0.68484	0.72722	0.76404	0.84650	0.91878	1.00212
(4) log E	9.97313	0.00432	0.07918	0.11727	0.14922	0.21748	0.27416	0.33646
(5) Diff	0.60247	0.60208	0.60566	0.60995	$0.6\overset{1}{\times}482$	0.62902	0.64462	0.66566
1.12057	1.72140	1.72101	1.72459	1.72888	1.73375	1.74795	1.76355	1.78459
6 = (5) + log $F_{13.20}$	1.72304	1.72265	1.72623	1.73052	1.73539	1.74959	1.76519	1.78623
	5265	5260	5304	5356	54.17	55.97	5802	6090
Dist − C	52.85	52.80	53.24	53.77	5437	56.18	58.24	61.13
	53.00	$53.0\overset{6}{\cancel{5}}$	$53.\overset{44}{\cancel{25}}$	53.93	54.81	56.25	58.38	61.38
		−.26	−.20	−.16	−.44	−.07	−.14	−.25
		−46	−.40	−.37	−.64	−.28	−.36	−48

1.10	+ 2.62	3.30	4.38	5.29	6.54	8.65	× 12.90	× 14.40
0.32222	0.55871	0.63347	0.73078	0.79865	0.87737	0.98453	1.14301	1.18752
~~0.04139~~	~~0.41830~~	~~0.51851~~	~~0.64147~~	~~0.72346~~	~~0.81558~~	~~0.93702~~	~~1.11059~~	~~1.15836~~
	~~0.83660~~	~~1.03702~~	~~1.28294~~	~~1.44692~~	~~1.63116~~	~~1.87404~~	~~2.22118~~	~~2.31672~~
0.64444	1.11742	1.26694	1.46156	1.59730	1.75574	1.96906	2.28602	2.37504
0.04139	0.41830	0.51851	0.64147	0.72346	0.81558	0.93702	1.11059	1.15836
0.60305	0.69912	0.74843	0.82009	0.87384	0.94016	$1.0\overset{3}{\cancel{8}}204$	1.17543	1.21668
	1.81805	1.86736	1.93902	1.99277	2.05909	$2.15\underset{5}{0}97$	2.29436	2.33561
1.72362	$1.8\overset{1969}{\cancel{9149}}$	1.86900	1.94066	1.99441	2.06073	$2.1\underset{5}{\cancel{8}}261$	2.29600	2.33725
	65.77	7368	8620	9835	114.5	142.11	196.95	
52.92	66.02	73.96	87.23	98.72	115.01	~~152.27~~	197.70	217.40
53.25	66.00	$73.9\overset{4}{\cancel{2}}$	87.12	98.44	114.38	141.75	197.25	216.75
−.33	+.02	+.02	+.11	+.28	+.63	+.36	+.45	+.65
	−.23	−.26	−.33	−.09			−.30	

Tuesday Oct 16 1906

Professor Pickering has proposed a plan of measuring the diameters of stellar images by using a double-image prism. The distance at which the prism is held from the plate to make the two images tangent will be a measure of the diameter.



A) Measured the distance between 3 lines drawn at about 0.125 cm apart. (The upper edge of tube carrying prism was used as index.)

(1) Lens of focus 17 inches held about 30 cm from the lines.

	cm	
	15.6	28.3
	15.7	27.0
	16.2	26.8
Mean	15.8	27.7

Diff = 11.9 Zero = 15.8 − 11.9 = 3.9

Same except focus = 40 inches & apparatus more rigid.

(2)	16.0	25.3
	15.7	29.2
	14.6	27.0
Mean	15.5	27.2

Diff = 11.7 Zero = 15.5 − 11.7 = 3.8

Same Prism reversed.

(3)	15.7	27.4
	16.1	27.9
	14.8	27.2
Mean	15.5	27.5

Diff. = 12.0 Zero = 15.5 − 12.0 = 3.5

Same Focus = 17

	Prism same			Prism reversed.	
(4)	15.4	27.2	(5)	15.5	27.1
	15.5	27.6		14.5	26.1
	15.2	28.6		15.1	26.2
Mean	15.4	27.8		15.0	26.5

Diff = 12.4 Zero = 15.4 − 12.4 = 3.0 Diff = 11.5 Zero = 15.0 − 11.5 = 3.5

Tuesday Oct 16 1906

B Measures were made of reticule lines $\overset{cm}{0.10}$ apart on glass.

	12.9	24.0
	12.7	23.4
	14.3	24.1
Mean	13.3	24.0

(Measures were made with extreme difficulty as lines were not clearly seen)

Diff 10.7 Zero = 13.3 − 10.7 = 2.7.

Foc 17
15.6
28.3
15.7
27.0
16.2
26.8

focus 40

16.0	25.3
15.7	29.2
14.6	27.0

prism mounted

Focus 40

15.7	27.4
16.1	27.9
14.8	27.2

Focus 17

15.4	27.2
15.5	27.6
15.2	28.2

prism unmounted

15.5	27.1
14.5	26.1
15.1	26.2

24.0	11.1
23.4	10.7
24.5	10.2
11 9	
24.0	10.7

Measures of [illegible]

$\overset{cm}{0.7}$ = $\overset{cm}{0.10}$ on plate.

Tuesday Oct 16 1906

B Measures were made of reticule lines $\overset{cm}{0.10}$ apart on glass.

	12.9	24.0
	12.7	23.4
	14.3	24.5
Mean	13.3	24.0

(Measures were made with extreme difficulty as lines were not clearly seen)

Diff 10.7 Zero = 13.3 − 10.7 = 2.7.

12.9	24.0	11.1
12.7	23.4	10.7
14.3	24.5	10.2
9 9	11 9	
		10.7
13.3	24.0	

13.3
~~1.2~~
12.1

13.3
10.7
2.6

Measure of mm Space

$\overset{cm}{10.7}$ = $\overset{cm}{0.10}$ on plate.

Tuesday Oct 16 1906

Measures with double image prism of lines spaced approximately at equal intervals. 11 spaces = 0.80 cm ~~8.0 mm~~.
1 space = 0.072 cm ~~0.72 mm~~.

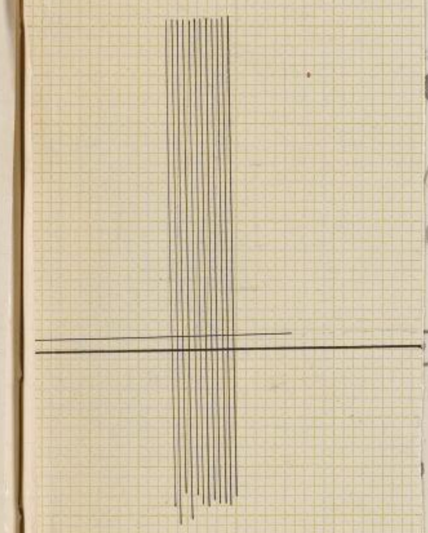
3 Coincidences were made. Measures in cm from surface, on which lines were drawn, to edge of tube carrying prism.

	1st		2nd		3rd	
	cm		cm		cm	
	10.3	−1	18.0	+2	25.9	+8
	11.0	+2	17.7	−1	25.4	+3
	10.4	−4	18.4	+6	24.6	−5
	11.7	+9	17.2	−6	25.3	+2
	10.7	−1	17.9	+1	24.5	−6
		5)21		5)16		5)24
Mean	10.8	±4	17.8	±3	25.1	±5
Diff.		7.0		7.3		

Therefore the scale is almost exactly 100:1

Zero = ~~10.7~~ 10.8 − 7.2 = 3.6

Tuesday Oct 16 1906



0.3 -5	18.0 +2	25.9 +8
1.0 +2	17.7 -1	25.4 +3
0.4 -4	18.4 +6	24.6 -5
1.7 +9	17.2 -6	25.3 +2
0.7 -1	17.9 +1	24.5 -6
41 5/21 ±4	42 9.6 ±3	57 5/24 ±5
.8	17.8	25.1

7.0 7.3

.75

3

~~25~~

.04
.03
.0012

Measure of ||||

Tuesday Oct 16 1906

10.3 −5	18.0 +2	25.9 +8
11.0 +2	17.7 −1	25.4 +3
10.4 −4	18.4 +6	24.6 −5
> 11.7 +9	> 17.2 −6	> 25.3 +2
10.7 ~~[illegible]~~ −1	17.9 +1	24.5 −6
41 5|21 ±4	42 5|16 ±3	57 5/24 ±5

10.8 17.8 25.1

7.0 7.3

.75

3

~~25~~

.04
.03
.0012

Measures of IIIII

Wednesday Oct 17 1906

Measured D6853 with apparatus used for measures of γ 120. The lines are quite accurately 0.02 cm apart.

11 Coincidences were made

	cm	Cor for zero 3.5	Call the ratio 1:100 cm	Resid	Diff	Ratio 1:106	Res	Diff
1	3.3							
2	5.8	2.3	0.023	+3	0.023	0.022	+2	22
3	7.8	4.3	0.043	+3	0.020	0.041	+1	19
4	9.8	6.3	0.063	+3	0.020	0.059	−1	18
5	12.0	8.5	0.085	+5	0.022	0.0~~71~~ 80	0	21
6	14.0	10.5	0.105	+5	0.020	0.099	−1	19
7	15.9	12.4	0.124	+4	0.019	0.117	−3	18
8	18.4	14.9	0.149	+9	0.025	0.141	+1	24
9	20.5	17.0	0.170	+10	0.021	0.160	0	19
10	22.7	19.2	0.192	+12	0.022	0.181	+1	21
11	24.8	21.3	0.213	+13	0.021	0.201	+1	20

~~Mean for zero~~ 3.9
Values of zero: 3.8
3.5
3.0
3.5
2.7 omit
3.6
3.3

Mean 3.5

Wednesday Oct. 17, 1906.

By using Zero = 3.5 & ratio 1:106

0.022 the greatest residual is 0.003 cm.

0.041

0.060

0.081

0.100

I	II	III	IV	V	VI	VII
~~3.0~~	~~4.3~~	~~7.5~~	~~9.2~~	~~11.8~~	~~13.6~~	~~14.7~~
3.3	~~5.1~~ 5.8	7.8	9.8	12.0		14.0

	VIII	IX	X		XI
	15.9	18.4	20.1	22.7	24.8
	~~16.0~~ ~~18.4~~	~~18.4~~	~~20.7~~		~~24.8~~

Wednesday Oct 17 1906

Same measures as last.

D6853

				Shifting D6853 to left			Mean	Cor. for zer.	Res. f[illegible]
1	3.4	3.6	3.6	3.9	3.7	36	3.~~7~~6	0.0	
2	5.0	5.0	5.0	5.2	5.4	6	5.1	1.5	-5
3	7.1	6.9	6.9	7.4	7.0		7.1	~~8~~3.5	+5
4	9.4	8.8	9.3	8.9	9.5		9.2	5.6	+4
5	11.1	10.9	11.0	11.2	11.0		11.0	7.4	-6
6	13.7	13.9	13.1	12.7	13.3		13.3	9.7	-3
7	15.9	16.0	15.1	15.7	15.2		15.6	12.0	0
8	17.4	17.8	17.6	16.9	17.8		17.5	13.9	-1
9	19.8	20.0	19.9	19.9	19.5		19.8	16.2	+2
10	2~~0~~1.9	22.3	22.5	22.0	22.1		22.~~1~~2	18.6	+6
11	23.9	24.9	24.6	~~25.7~~ 23.7	24.1		24.2	20.6	+6

0.001 cm

Dist.

8.3

8.4

8.4

8.2

8.2

Mean 8.3

Corr. for zero 3.6

4.7 Diameter = 0.047 cm approx.

Thursday Oct 18 1906

Measures of D 6853 Continued.

Apparatus changed. Lens of shorter focus used.

		Readjusted apparatus.					Mean	Cor. for Zero.	
1	3.4	3.2	3.4	3.5	3.6	3.4	3.4	0.0	
2	5.1	4.8	4.9	5.0	5.1	4.8	4.9	1.5	-5
3	7.3	6.7	6.6	6.7	6.7	6.7	6.7	3.3	-7
4	8.7	8.6	8.6	8.4	8.6	8.9	8.6	5.2 ~~7.9~~	-8
5	10.7	10.8	10.9	10.6	10.8	10.7	10.8	7.4	-6
6	12.8	12.6	13.1	12.2	12.9	12.8	12.7	9.3	-7
7	14.8	14.6	14.5	14.8	15.0	15.0	14.8	11.4	-6
8	16.5	16.6	17.0	16.7	16.8	16.8	16.8	13.4	-6
9	18.1 ~~17.6~~	18.9	19.0	19.3	18.9	19.2	19.1	15.7	-3
10	~~18.7~~ 20.1								
									0.001 cm

If we use 2.8 for Cor for Zero we have

		Resid for Ratio 1:100
1	0.6	+6
2	2.1	+1
3	3.9	-1
4	5.8	-2
5	8.0	0
6	9.9	-1
7	12.0	0
8	14.0	0
9	16.3	+3
		0.001 Cm.

Over.

Thursday Oct 18 1906

From experiment it appears that the position angle of the two images affects the measures. Thus far ~~the~~ angle has been 90–270 if we ~~record~~ reckon 0–180 as vertical. It also makes a difference which side of the prism is next the eye.

Vertical scale.
2 4.7
6. 12.5

For example
6 which is recorded
12.7 on preceding page
becomes about 8.1
when prism is turned end
for end

Measures of perfectly round point on Lantern Slide

Pos. Angle of Prism	R.	L
	10.3	9.4
0	9.4	9.3
90	9.4	9.1
~~x~~ 180	10.4	10.5
270	9.9	9.9

Brought to Centre of field

Prism may be eccentric in Tube

I have not been able to place the prism in any position so as to produce an entire coincidence of all lines at right angles to each other, although I can place the prism near enough to the plate to cause the two images to cross each other.

Friday Oct 26 1906

Experimented with double image prism for measuring the diameter of Stars. Used it with 2" & 1" eyepieces in front of & also between lenses. Tried linear motion & tipping to produce separation but all images were hazy & the separation not satisfactory. Also tried it with 2" microscopic objective, prism between objective & ~~obj~~ point to be measured. The images were quite fair when examined with a 2" eyepiece, ~~At~~ The separation was a little over 0.2 mm. & could be made in two directions which would be an advantage. I consider that this experiment is most satisfactory when it is necessary to have considerable magnifying power.

Thursday Nov 22 1906.

Measures of thickness of Shade d
with Micrometer Calipers

~~32~~
~~.038~~
.068
.058
.062
.063
.062
.058
.066
.062
.064
.062

10 | 25

.0625
25.4

2500
3125
1250
1.58750 mm.

3 | 1.58750
0.53

Shade C in center
= .064

Tuesday. Nov 12, 1907.

From C 17175 found diameter of Sun = 3.7 cm.

On C 17153 found 8 div = 10.5 cm

Therefore Enlargement = 13.12 times

On C 17151 7 div = 9.15 cm

Enl = 13.07 times

On C 17151 6 div = 7.85 cm.

(Lengthwise the plate) Enl = 13.08 times

On C 17161 4 div = 5.20 cm 13.10 times

(Lengthwise)

Radius 2) 3.7

1.85 cm

13.1

185

555

185

Radius of Enl. Image. 24.235 cm. 24.24 cm

Tuesday Nov 12 1907

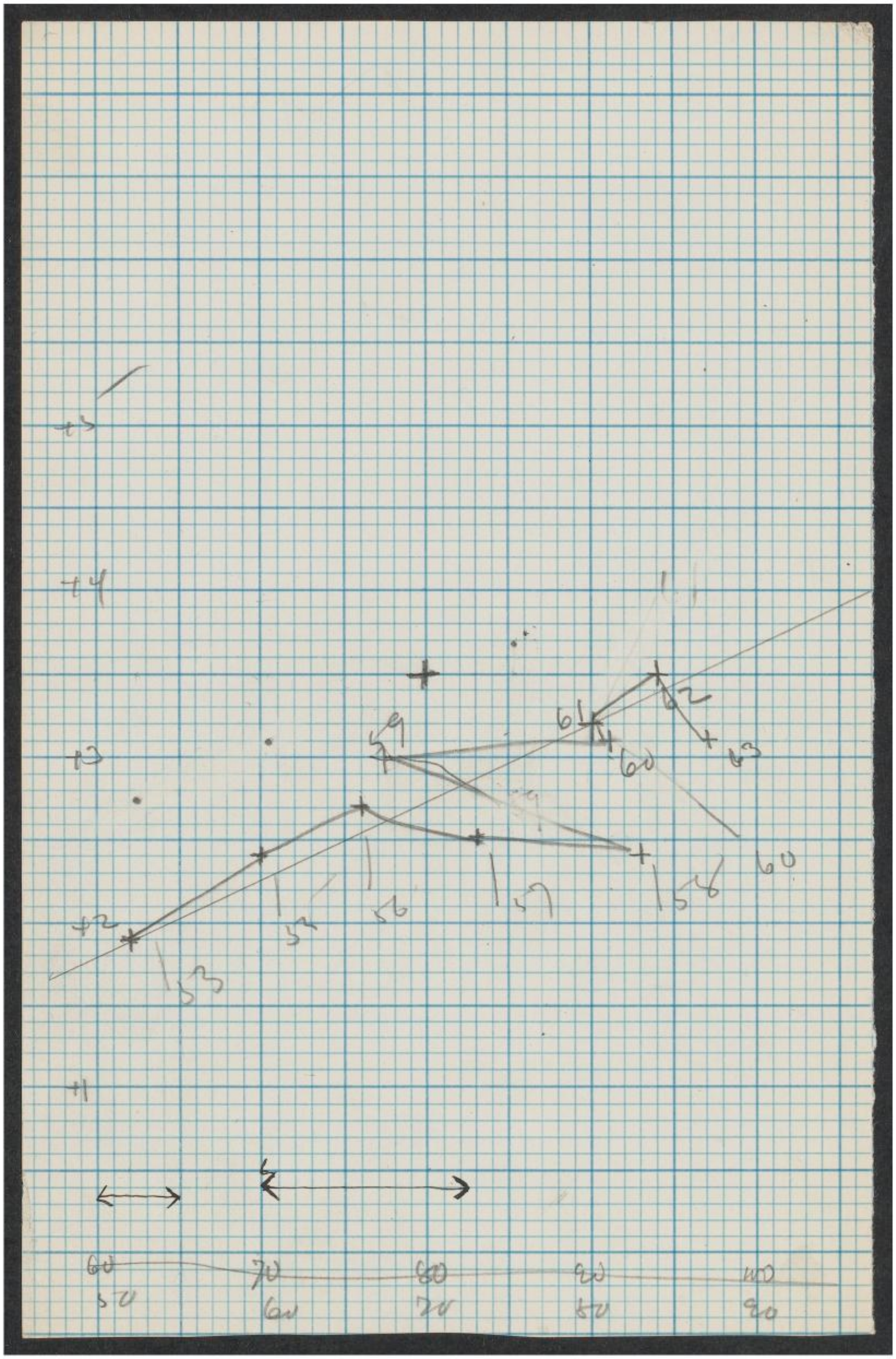
Measured transit of Mercury plates with scale of D 10836 width of sq. 6.55

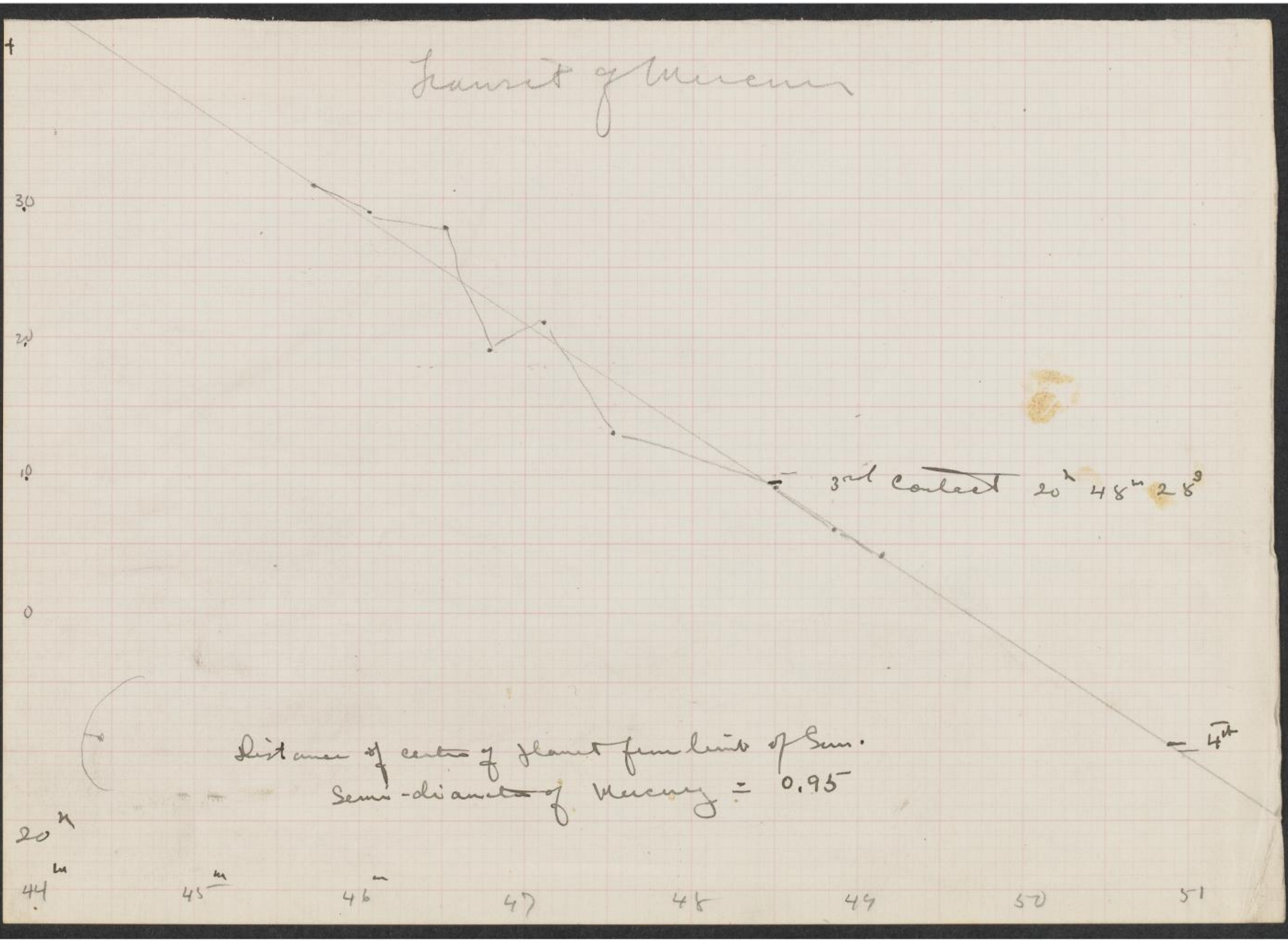
$\frac{}{13.10}$ 2

~~C17151~~

Plate	Points		Mercury	
$C17^{8}157$	3 forts { $\overset{-}{\cancel{+}}$4.0	− $\overset{+}{\cancel{+}}$0.3	$\overset{+}{\cancel{+}}$2 div + 0.4	+1 div + 0.6
			13.1	6.6
	$\overset{-}{\cancel{+}}$4.0	− $\overset{+}{\cancel{+}}$0.3	4	0.6
			13.5	0.3
			4.0	
			− 17.5	− 7.5
C17152	−0.6	+3.6	+1 div +2.8	0 − 0.4
	−0.3	+3.9	6.6	+3.6
	+0.5	+3.4	+9.4	− 4.0
	3|− 0.4	3|10.9	−0.1	
	− 0.1	+3.6	− 9.5	
C17153	+0.4	−0.7	+1 div − 0.2	+0.9
	+1.0	−0.7	6.6	1.0
	+1.4	−1.1	−0.2	+1.9
			6.4	
	+1.8	−1.3	+1.2	
	4|4.6	4|3.8	+5.2	
	+1.2	−1.0		
$C1715\overset{5}{\cancel{4}}$	$-5.\overset{2}{\cancel{2}}$	−1.4	+1.1	+1.0
	$5.\overset{0}{\cancel{4}}$	1.2	4.9	1.4
	4.4	1.6	+ 6.0	+2.4
	3|14.6	3|4.2		
	− 4.9	−1.4		

6.4
6.2
5.6
3\|18.2
6.1


+5
+4
+3
+2
+1
53
54
56
57
58
59
60
61
62
63
60
60
70
80
90
100
50
60
70
80
90


Transit of Mercury
+
30
20
10
0
3rd Contact 20h 48m 28s
4th
Distance of centre of planet from limb of Sun.
Semi-diameter of Mercury = 0.95
20h
44m
45m
46m
47
48
49
50
51

Tuesday Nov 19 1907

C17156

-.1 -1.4

+0.4 -1.6 +1 div +0.6 +1.1

+1.4 -1.7 6.6 -1.6

2)+1.7 2)17 +7.2 +2.7

06

+0.6 -1.6 +6.6

C17157 -0.4 -1.6 .1 div + 0.8 +0.9

+0.4 -1.6 6.6 1.6

+0.4 -1.6 +7.4 +2.5

,

+0.1 -1.6 +7.3

C17158 -0.1 -0.9 1 div + +1.6 +1.5

6.6 -0.9

8 2 +2.4

-0.1

+8.3

C17159 -2.0

+6.7 +3.0

C17160 -47 -2.2 +3.4 + 0.9

4.7 - 2.2

+ 8.1 +3.1

C17161 -44 -+2.7

-4.3 -+2.4 +4.1 +0.6

-4.3 -+2.4 -3.9 +2.6

-2.7 -+3.0 + 80 +3.2

4)15 7 4)10 5

- 3.9 -+2.6

C17162 ~~+2~~

-4.4 -2.8 +4.0 +0.7

-4.4 2.8

+8.4 +3.5

C17163 -48 -3.0

+3.9 +0.1

-4.8 -3.0

+8.7 +3.1

Tuesday Nov 12 1907

Transit of Mercury plates

Dist of centre from limb.

Plate n	I		(1) I×2 ~~I~~	(2) II	III	(3) III×.4 ~~III~~
17153	2.1	4.1	42	4.1	10.0	4.0
55	1.6 ✓	3.2	32	3.2	7.0	2.8
56	1.5 ✓	3.0	30	3.0	7.0	2.8
57	1.4 ✓	2.9	28	3.0	6.5	2.6
58	1.0	2.1	20	~~3~~2.0	4.0	1.6
59	1.0	2.1	20	2.2	5.0	2.0
6.0	0.6 ✓	1.5	12	1.0	4.2	1.7
61	0.5	1.4	1.0	0.8	2.0	0.8
62	0.2	0.8	0.4	0.6	2.0	0.8
63	0.0	0.5	0.0	0.5	1.5	0.6

Diam = 1.0

Diam = 2.0

Scale = 1/10 inch

Scale = 1/20 inch

Scale = 1/5 mm
1/2 mm

Wednesday Nov 20 1907

Appr. E.T.		Mean of (1),(2),&(3)		Resid.			Error in Dist.		Error in Time
							Div.		
20	43 (43?	4.1	4.1	+1	0	−1	~~0~~	0	0^s
20	45 43	3.1	3.1	+1	+1	−3	~~+.05~~	+.05	+5
	46 03	2.9	2.9	+1	+1	−1	~~+.30~~	+.30	+23
	46 31	2.8	2.8	0	+2	−2	~~−.35~~	−.35	−28
	46 47	1.9	1.9	+1	+1	−3	~~+.10~~	+.10	+7
	47 7	2.1	2.1	−1	+1	−1	~~−.35~~	−.35	−28
	47 31	1.4	1.3	−1	−3	+4	~~0~~	0	0
	48 30	1.0	0.9	+2	−1	−1	~~0~~	0	−2
	48 51	0.7	0.6	−2	0	+2	~~0~~	0	0
	49 8		0.4	−4	+1	+2			
	~~49 23~~								

Diam of Mercury = 4.94 × 2 = 9.88″

= 1.9 units of the above scale.

9.88
13.1
988
2964
988
52.6) 1~~3~~9.428 (2.46
12
1052
2422
2104
3188
3156

mm
2.46
20
254) 49.20 (19.2
254
2380
2286
940

Time of 3rd Contact found from plotting of the above means is 20h 48m 28s. E.T. (Bond 394)

If the 4th contact may be considered determinable from ~~A~~ plotting, it is 20h 50m 52s ET (Bond 394)

Monday May 18, 1908.

Position of Venus at Greenwich noon.

May.

	RA			Dec		
18	6	46	39	+26	28'	58"
		3	16		4	35
	6	43	23	26	33	33
20	6	52	58	+26	17	18
		3	16		4	35
	6	49	42	26	21	53
25	7	07	15	+25	42	00
		3	16		4	35
	7	03	59	25	46	35
30	7	19	04	+24	59	26
		3	16		4	35
	7	15	48	+25	04	01

Precession for 7 ∾ +26 from Washburn vol II

RA $\overset{s}{3}.702 \times 53 = 196.206 = +3^m\ 16^s$

Dec $+5''.19 \times 53 = 275''.07 = -4\ 35''$

Mr Dennis interpolates +3 16.16 & −4 35.1

Additional Positions,

19	6	49	51	+26	23	19
		3	16		4	35
	6	46	35	26	27	54
~~24~~ 29	7	16	56	+25	8	26
		3	16		4	35
	7	13	40	+25	13	01
21	6	56	0	+26	10	54
		3	16		4	35
	6	52	44	26	15	29

BD 26° 1405	6	49 51	+26	16	6.5	} Near on May 20th
BD 26° 1411	6	50 31	+26	06	6.5	}
BD 25° 1660	7	14	+25.3			
	~~6~~	~~50 26~~	~~+26~~	~~15~~	5.0	Near for May 29th

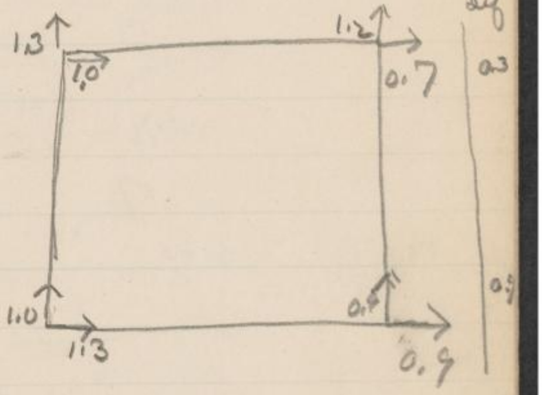
Tuesday April 20 1909.

Measures made with D16836.

For accuracy of enlargement 1.0 of Bruce plates.

D14003 Enl. super posed on reseau.

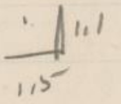
Position x	Position y	x	y
0	0	1.3 mm.	1.0 mm
0	30	1.0	1.3
30	0	0.9	0.9
30	30	0.7	1.2

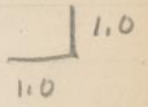


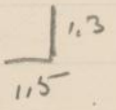
Diff 0.3 0.3

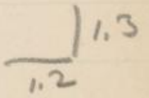
D14004 Enl ~~sfa~~ super posed on Reseau turned thru 180°.

Position x	Position y	x	y
0	0	1.5	1.3
0	30	1.5	1.1
30	0	1.2	1.3
30	30	1.0	1.0









Saturday May 22 1909

Angular Apertures for Plat. D

Aperture	cm	÷40.	½ angular aperture	Angular
10	0.58	0.014	0.80	1.6
11	0.92	0.023	1.32	2.6
12	1.45	0.036	2.06	4.1
13	2.40	0.060	3.43	7.9
14	3.70	0.092	5.26	10.5
15	6.88	0.172	9.76	19.5
16	9.48	0.237	13.33	26.7
17	15.80	0.395	21.56	43.1

Friday April 29 1910

The following readings of settings & the corresponding enlargement were made this P.M. The lens is Cooke Series V No 17486

taking

new

Lens setting	Easel setting	Enl	Reading
13.10	197 1/4	12.6	12.60
13.20	181 1/2	11.4	11.40
13.30	171 1/4	10.6	10.60
13.~~5~~40	159 1/4	9.7	9.70
13.50	151 3/4	9.2	9.20
13.60	143	8.5	8.50
13.70	138	8.1	8.10
13.80	130 1/2	7.55	15.~~[illegible]~~10
13.90	125	7.17	14.~~8~~34
14.00	120 1/2	6.82	13.64
14.20	113 3/4	6.30	12.60
14.40	105 3/4	5.70	11.40
14.60	101	5.30	10.60
14.80	95 1/2	4.86	9.72
15.00	91	4.50	9.00
15.35	85	~~8.12~~ 4.06	16.24
15.70	80	~~7.35~~ 3.68	14.70
16.20	75	~~6.50~~ 3.25	13.00

l setting		Reading
71	2.90	11.60
5 3/4	2.46 ~~20 div~~	9.82
3 1/2	2.26 20 div	22.60
~~[illegible]~~ 1 3/4	2.09	20.90
60 1/4	1.94	19.40
58 1/4	1.71	17.10
56 5/8	1.51	15.10
55 3/8	1.35	13.50
54 7/8	1.23	12.30
54 1/2	1.13	11.30
54 1/2	1.05	10.50
54 1/2	1.01	10.10
54 1/2	1.00	10.00
54 1/2		9.80

Friday April 29 1910

The following readings of settings & the corresponding enlargement were made this P.M. The lens is Cooke Series V No 17486
which it [illegible] taking
AC fe [illegible] now
fr e [illegible]

Lens setting	Easel setting		Reading
16.70	71	2.90	11.60
17.50	65 3/4	2.46 ~~20 div~~	9.82
18.00	63 1/2	2.26 20 div	22.60
18.50	6~~2~~1 3/4	2.09	20.90
19.00	60 1/4	1.94	19.40
~~19.50~~			
20.00	58 1/4	1.71	17.10
21.00	56 5/8	1.51	15.10
22.00	55 3/8	1.35	13.50
23.00	54 7/8	1.23	12.30
24.00	54 1/2	1.13	11.30
25.00	54 1/2	1.05	10.50
25.50	54 1/2	1.01	10.10
25.70	54 1/2	1.00	10.00
26.00	54 1/2		9.80

Tuesday Oct 25 1910

Method of Least Squares. (2 unknown quantities)

Normal Equations

$$[aa]x + [ab]y + [an] = 0$$

$$[ab]x + [bb]y + [bn] = 0$$

Eliminate x

$$\left([bb] - \frac{[ab]}{[aa]}[ab]\right) y + [bn] - \frac{[ab]}{[aa]}[an] = 0$$

or

$$[bb.1]\, y + [bn.1] = 0$$

weight of y # $[bb] - \frac{[ab]}{[aa]}[ab] = p_y = [bb.1]$

weight of x # $[aa] - \frac{[ab]}{[bb]}[ab] = p_x = p_y \frac{[aa]}{[bb]}$

$= [bb.1] \frac{[aa]}{[bb]}$

$$[nn.1] = [nn] - \frac{[an]^2}{[aa]}$$

$$[nn.2] = [nn.1] - \frac{[bn.1]^2}{[bb.1]}$$

check

$[vv] = [nn.2]$

Mean error of single obs. $\varepsilon = \sqrt{\frac{[nn.2]}{(m-2)}}$

$$\varepsilon_x = \frac{\varepsilon}{\sqrt{p_x}}$$

$$e_y = \frac{\varepsilon}{\sqrt{p_y}}.$$

For probable error multiply by 0.1745

tithes)

object like an electric lamp
produces an out-of-focus image
...ical focus of this lens, the
the light will placed be in
the lens.

Monday Oct 16 1911

Law of Out-of-focus Images.

Work of comparing Stand. Electric Lamps ~~with~~ requires use of 11-inch Draper Telescope. I have derived the following result in finding the relation of brightness to the image.

As the distance at which the lamp may be placed from the instrument is limited, it will ~~be~~ probably be [illegible] inside instead of

~~[illegible]~~ are

Lamp

[aa]	[ab] $\frac{[ab]}{[aa]}$	[as] $\frac{[as]}{[aa]}$	[an] $\frac{[an]}{[aa]}$		
	[bb] $\frac{[ab]}{[aa]}$ [ab]	[bs] $\frac{[ab]}{[aa]}$ [bs]	[bn] $\frac{[ab]}{[aa]}$ [an]	[sn] $\frac{[as]}{[aa]}$ [an]	[nn] $\frac{[an]}{[aa]}$ [an]
	[bb.1]	[as.1]	[bn.1] $\frac{[bn.1]}{[bb.1]}$	[sn.1]	[nn.1] $\frac{[bn.1]^2}{[bb.1]}$

[nn.2]

numerical

produce of

mean

2

relation

$= \frac{f}{F}$

of the

of

lens.

to

absorption of the lens.

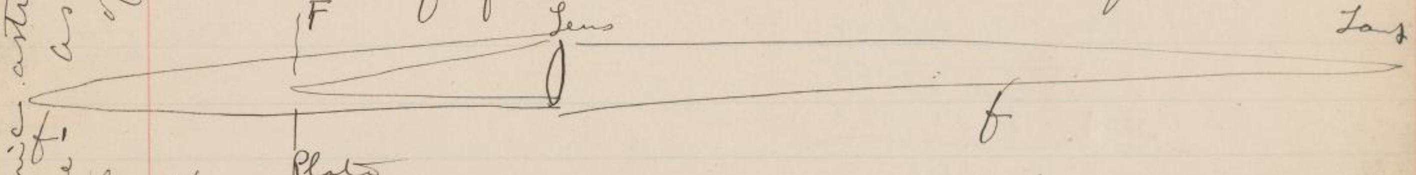
Neglecting absorption the rule is:— For ~~an~~ bright object like an electric lamp placed at a finite distance from a lens, which produces an out-of-focus image on a plate set at the ~~photographic~~ astronomical focus of the lens, the intensity of the image is the same as if the light were placed at a distance equal to the focal length of the lens.

Monday Oct 16 1911

Law of Out-of-focus Images.

Work of comparing Stand. Electric Lamps ~~with~~ requires use of 11-inch Draper Telescope. I have derived the following result in finding the relation of brightness to the image.

As the distance at which the lamp may be placed from the instrument is limited, it will ~~be~~ probably be necessary to set the plate inside instead of outside of focus as usual. ~~The question are~~



Thus the plate might be placed at the astronomical focus F and the out-of-focus image produced by having the lamp ~~at less than~~ rather near which distance call f.

The light falling on the lens will vary as 1 to f^2.

The intensity of light falling on the plate will bear relation to light falling on lens as f' to $f'-F$

From equation $\frac{1}{f}+\frac{1}{f'}=\frac{1}{F}$ we have $\frac{f'}{f'-F}=\frac{f}{F}$

Therefore the intensity on plate will be $\frac{1}{f^2}\times\frac{f^2}{F^2}=\frac{1}{F^2}$ Hence, for the conditions as stated, the intensity of the image on the plate is independent of the distance of the lamp from the lens.

Note:— In computing allowance must be made for the absorption of the lens.

Friday Nov 3 1911.

Absorption of Shade "d" to Elec Lamps photographed through 11-inch Draper Tel.

Difference in light to compute absorption of Shade "d".

Two exposures.

One with plate at principal focus to out-of-focus image.

Second to same light through inverted telescope with plate near lens.

Scale - 52".6 = 1mm

log 206264.8 5.31443 52".6 : 1 :: 206265 : —

log 52".6 1.72099

3.59344

log 25.4 1.40483

2.18861

154.4 inches = Focal length

Distance from plate to light for 2nd exp measured = 71.2 ft

12

1424

712

854.4 inches

Ratio log 854.4 = 2.93166

log 154.4 = 2.18865

.2) 0.74301

Diff, 3.72 mags.

For diff 3.00 m 3.00

.2

0.6000

2.18865

2.78865 12) 615 inches

51.2 ft

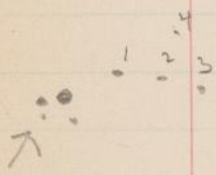
13.0

38.2

Friday Feb 16 1912

E.T.
About 10 45

Examined Trapezium with 6-inch at request of E T K. Star θ'D. Could just see the star. Estimated roughly that it was 2 magn. fainter than faint of intermediate stars of Trapezium. Planet fainter than × 3 in accompanying diagram. Appeared equal to × 4, but was probably brighter due to proximity of star just above it.



Wednesday March 13, 1912

Nova Geminorum field glass

10 40 E.T.

~~v~~ θ Gem. 3 V

E.T.K.

$6^h\ 38^m\ +25°$ 1 V

V 1 ι Gem 10 55 E.T.

at 10 35

Called Nova = K Geminorum

E.S.K.

θ Gem 3.64
3
3.94

$6^h\ 38\ +25$
ι Gem var.

ι Gem. 3.89
1
3.79

mean 3.94
3.79
2)773
3.86

K Gem 3.67

3.94
3.79
3.67
3)1140
3.80

Thursday March 14 1912

7 25 ~~Nova = θ~~ 3.64
0.1
Nova 0.1 brighter than θ Geminorum 3.54
E.S.R.

Nova = θ Gem 3.64
7 15 " 2 ι Gem E.T.K 3.69
3.66

187

Mean of all 3.62

Thursday March 22 1917

Examination of Cooke Lens No 1665 to obtain setting for [Working of enlarging

Photographic Reticle and reversed.

Lens	Easel	Reticle	Screen	Enl.	
13.1	200	1 cm.	13.4 cm.	13.4	
13.2	185	1 cm.	12.2 cm.	12.2	
13.3	172	1 cm.	11.2 cm.	11.2	
13.4	160	2 cm	20.5 cm.	10.25	about 18.9
13.5	150	2 cm.	19.9 cm.	~~9.95~~	9.45
13.6	141	2 cm.	17.5 cm	8.75	
13.7	134	2 cm.	16.4 cm.	8.2	
13.8	127.5	3 cm.	23.2 cm	7.73	
13.9	122.5	3 cm.	21.9 cm.	7.30	
14.0	118	3 cm	20.9 cm	6.97	
14.2	110	3 cm	19.0 cm	6.33	
14.4	102.5	4 cm.	22.9 cm	5.72	
14.6	97	4 cm.	21.1 cm	5.28	
14.8	91.5	5 cm	24.2 cm	4.84	
15.0	88.0	5 cm.	22.8 cm	4.56	
15.5	80.0	6 cm.	23.3 cm.	3.88 ~~4.66~~	
16.0	74.0	6 cm.	20.3 cm.	3.~~77~~ 38	
16.5	69.0	6 cm.	17.7 cm.	2.95	
17.0	65.5	6 cm	15.9 cm	2.65	
17.5	63.3	6 cm	14.6 cm	2.43	
18.0	61.0	6 cm	13.3 cm	2.22	
18.5	58.8	6 cm.	12.1 cm	2.02	
19.0	57.5	6 cm.	11.2 cm	1.87	
19.5	56.2	6 cm	10.4 cm	1.73	
20.0	55.5	6 cm.	9.8 cm	1.63	

Friday March 23 1911

Enl. app. repaired to bring easel more nearly vertical and normal [illegible] of the lens.

Lens	Easel	Reticle	Screen cm.	Enl
14.0	118	3 cm	20.7	6.90
15.0	88	5	22.6	4.52
16.0	74	6	20.1	3.~~70~~ 38
17.0	66	6	15.9	2.65
17.5	63.5	6	14.5	2.42
18.0	61.	6	13.2	2.20
18.5	59.5	6	12.2	2.03
19.0	58.2	6	11.3	1.88
19.5	57.0	6	10.5	1.75
20.0	56.0	6	9.9	1.65
21.0	54.5	~~4~~ 5	7.2	1.44
22.0	53.5	5	6.5	1.30
23.0	53.1	5	5.9	1.18
24.0	53.0	5	5.5	1.10
25.0	52.8	5	5.0	1.00

4)52.8
13.2

1
25
13
12

Wednesday Feb. 18, 1920

Ratio of illumination from standard of surface to total illumination of hemisphere. (stand = illumin from circle 1' in diam)
Total illumination = projection of bright surface. In this case = area of one great circle

log radian (in minutes) = 3.53627
log ½' = 9.69897
2 / 3.83730
19.186 magn.

Thus, if aperture 17 computed as 17.01 magn of the ~~area~~ maximum light from sky. & the difference is 19.19 − 17.01 = 2.18 magn.
Ft

For circles at diff. zenith distances. corr

			Diff	÷ 0.2	
	90	0.00000			19.19
log sin	80	9.99335	0.00665	0.03	19.16
	70	$9.9\overset{?}{7}299$	0.02701	0.14	19.05
	60	9.93753	0.06247	0.31	18.88
	50	9.88425	0.11575	0.58	18.61
	40	9.80822	0.19178	0.96	18.23
	30	9.69897	0.30103	1.51	17.68
	20	9.53405	0.46595	2.33	16.86
	10	9.23967	0.76033	3.80	15.39

1902phae.proj..92BK

ich

~~4~~

12
4 44 31

4 44 31
0 47
4 43 44

.696
24
2784
1392
16.704
60
42.240

695
24
2780
1390
16.680
60
40.800

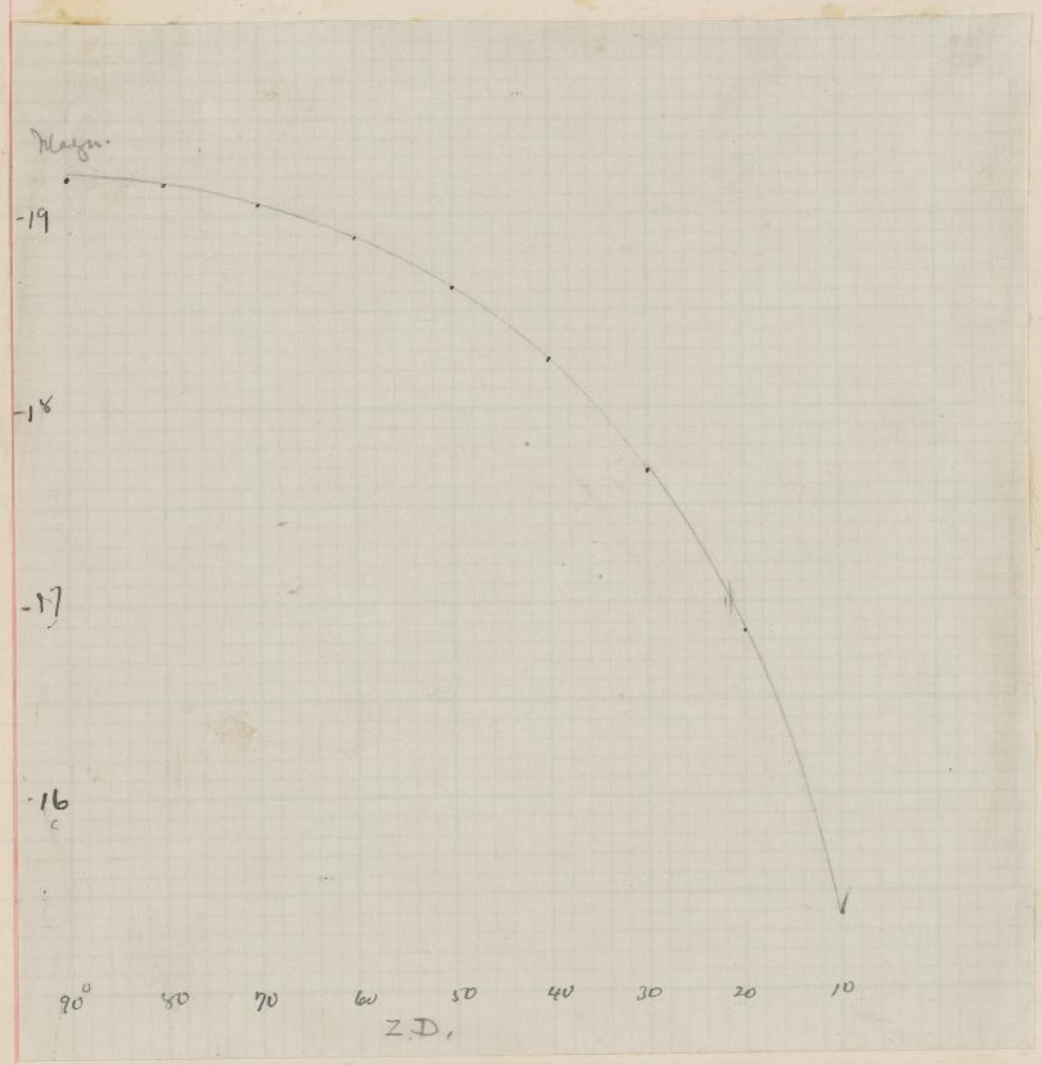
42.24
40.80
1.44

Magn.
-19
-18
-17
-16
90°

6) 41.783
24) 16.6964 (.695 ~~7~~ 68
144
229
216
136
120
164
~~168~~
144
202
192

6) .1
~~.06~~
6) .0016666
24) .0002777
.00001

$1^m =$ ~~1/100~~
.001
60) .00006
.00001


Magn.
-19
-18
-17
-16
90°
80
70
60
50
40
30
20
10
Z.D.

Index.

	Pages.
Measures Σ4306 (wedge) &c	1 – 6
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Measures wedge Hr. Tel.	10-30, 32 – 43
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Measures of Σ7210. preliminary to making wedge ~~for~~ or shades for Hr. Tel.	88 – 90
Measures of Σ 7214 (Strip for plates)	91, 2.

1902phae.proj..92BK

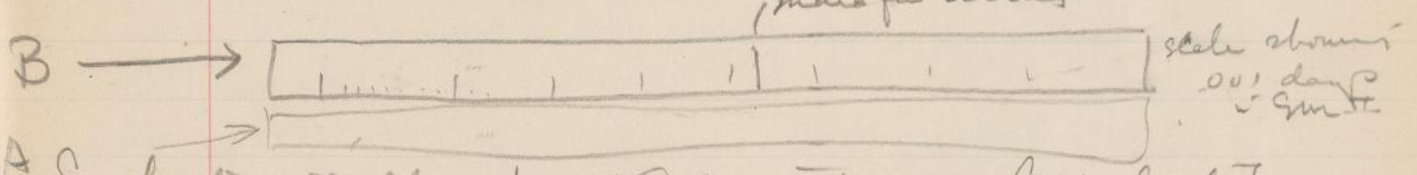
Tuesday April 6 1920

Made model of slide rule for converting Camb. Sid. Time to GMT in decimals of a day.

It consists of two rules;

A, a meter stick indexed so that a millimeter represents 1 minutes.

B a rule graduated to show thousandths of a day to correspond.



A Graduated to show hours & minutes of Camb. Sid. Time.

~~A~~ The index for setting is ~~closely at~~ .696 of decimal of GMT on A.

~~Ra~~ To set scales, find from Almanac R.A. of Mean Sun at Greenwich Mean Noon. Add 12 hours & set result found on A to ~~index~~ on B. Then Camb. Sid. time on A will correspond to GMT (thousandths) on B

---

12 00 + Ra of mean Sun at GMN.
4 44 31
16 44 31 = Sid. T at Greenwich elapsed since G.M.N.
2 44
16 41 47 = GMT = .696 day
.69568

6/41.8
24)16.697(.696
144
229
216
137

Wednesday May 12 1920

I had prepared, in anticipation of the recent lunar eclipse, to make measures of the brightness of the Moon when eclipsed, but was prevented by clouds. This was to be by comparing the image of the eclipsed Moon photographed in focus with images of stars taken out-of-focus by an amount sufficient to make the images of the same size of the Moon.

After the eclipse, it occurred to me that ~~the~~ method might be applicable to past eclipses of which we had photographs in focus.

By photographing the same field, the stars could be made to appear, (the same exposure being used as for the eclipse plate), as trails of the length occurring on the eclipse plate. This would give a comparison of the conditions holding for the two occasions. Another plate of this region or another region, if necessary to find suitable stars, would be taken out of focus. Thus the means would be given of finding a star whose image spread over the area occupied by the lunar image, would equal the density of such image.

Considering the 8-inch Draper, the distance at which the plate should be placed for focus would be about 70 mm.

Wednesday May 12 1920

In general, if

$R =$ Aperture of lens

$F =$ Focal length

& Moon = 30' in diameter

The size of moon in focus $= \frac{F}{114.6}$

$R : \frac{F}{114.6} :: F :$ dist fr focus

or Dist fr focus $= \frac{F^2}{114.6\ R}$

Calling $F = 1265$ mm   log F = 3.10209

$R = 200$ mm $\times 2$

log F^2 6.20418

log $\left(\frac{114.6 \quad 200}{229 \quad 20.0}\right)$ 4.36021

1.84397

Dist = 69.8

4 5